FOOD ENGINEERING

A McGRAW-HILL PUBLICATION • FORMERLY FOOD INDUSTRIES

March 1954

PACKAGING INSERT with DIRECTORY of EXPOSITION

LATEST ADVANCES in packaging, plus cost-cutting information, are presented in big special section. (P. 69)

In This Issue:

Taste 'Thermometer' . . 41
Controlled Brewing . . . 44
Nabisco Likes Ideas . . . 47
Cheese Runs Sped . . . 51
Dairy Streamlining . . . 52
Quickly Adds MSG . . . 56
Fungals' Bread Fast . . 58
Letters Re Inspection . 59
New Canning Units . . . 60
Q. C. at Mrs. Tucker's . 64
Avoids Caked Sugar . . 66
Maintenance 'Musts' . . 67
Oil-Products Foldout . 140
PACKAGING INSERT . . . 69
Flexibles Revamp Pattern . 70
Shipping Without Damage . 75
Bundling Frozen Foods . . . 78
Kraft's Packag . . . 82
Theory & Portion Packets . . 89
Dairies Rationalize Line . . . 92
Paper Cartons vs. Glass . . 101
SHOW PLANS, EXHIBITORS 104

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Coupon, Page 179

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Food Engineering

Vol. 26 • MARCH, 1954 • No. 3

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FOOD ENGINEERING
(Formerly Food Industries)
March 1954 Vol. 26, No. 3
Member ABC and ABP
Published Monthly by McGraw-Hill Publishing Company, Inc., James H. McGraw (1860-1948), Founder. **Publication Office 99-129 N. Broadway, Albany 1, N. Y.**
Executive, Editorial and Advertising Offices: McGraw-Hill Building, 330 W. 42nd St., New York, 36, N. Y. Donald C. McGraw, President; Willard Chevalier, Executive Vice-President; Joseph A. Gerardi, Vice-President & Treasurer; John J. Cooke, Secretary; Paul Montgomery, Senior Vice-President, Publications Div.; Ralph B. Smith, Vice-President and Editorial Director; Nelson Bond, Vice-President & Director of Advertising; J. E. Blackburn, Jr., Vice-President & Director of Circulation.
Subscriptions: Address correspondence to Food Engineering—Subscription Service, 99-129 N. Broadway, Albany 1, N. Y. or 330 W. 42nd St., New York 36, N. Y. Allow one month for change of address.
Subscriptions are solicited only from the executives, engineers, and technologists in food processing plants. Position and company connection must be indicated on subscription orders.
Single copies 35¢. Subscription rates—U. S. and possessions $2 for 1 yr., $3 for 2 yr., $4 for 3 yr. Canada, $3 for 1 yr., $4 for 2 yr., $5 for 3 yr. Other Western Hemisphere countries $10 for 1 yr., $16 for 2 yr., $20 for 3 yr. All other countries, $15 for 1 yr., $25 for 2 yr., $30 for 3 yr. Entered as 2nd class matter Aug. 26, 1948, at Post Office at Albany, N. Y. under Act of Mar. 3, 1879. Printed in U.S.A. Copyright 1954 by McGraw-Hill Publishing Co., Inc.—All Rights Reserved.

FEATURE ARTICLES

"Taste Thermometer" Brings Food Quality Into Focus	41
Statistical Control Technique—Management's "Radar"	44
Suggestion System Pays Multiple Dividends	47
Electric Trucks Fill Gap in Process Line	51
Single-Product Benefits in Multi-Product Plant	52
Adds MSG Solution at Packaging Line Speeds	56
New Enzyme Tablets Benefit Both Product and Process	58
New Units Attract Canners	60
Carload-to-Container Quality Control	64
Taking "Cake" Out of Sugar	66
Maintenance "Know-How"	67
Edible Oil Processing (Foldout Flowsheet)	140

PACKAGING SPECIAL With Show Guide

Flexibles Are Revamping Package Pattern	70
Damage to Shipped Food and How to Avoid It	75
Bundling Frozen Foods Can Cut Costs	78
How Kraft's Package Lab Works	82
One-Portion Packets Gaining	89
24 Low-Cost Devices Automate Package Line	92
Paper vs. Glass: "Where Do the Decimals Fall?"	101
Floor Plans of Packaging Show	104
List of Exhibitors	105

NEW EQUIPMENT & SUPPLIES

Unit Accurately Fills 300 to 325 Cans Per Minute	147
Retort Control System Is Highly Flexible	147
Compact Fork Truck Has Boarding-House Reach	148
Paper Carton Filler for Smaller Dairy	148
All-Aluminum Highlights New Control Center	149
Graders Employ New Fiberglas Shaker Pans	149
Burner and Boiler Combination	149
Speed Variations Controlled Electronically	151
Sanitary Meat Mixer Has Tilting Bowl	151
Compact Flow Regulator Is Easily Maintained	151
Sews Multi-Wall Bags at One or Both Ends	153
Overall Length Minimized on Powered Hand Trucks	153
Short Cab-Over-Engine Tractors for Maximum Loads	155
Hinged-Apron Conveyors Handle Numerous Items	155
Portable Unit Simplifies Electrical-Apparatus Checks	157
Telescopic Mover Takes Load on Stepped Levels	157
Power Up, Size Down in New Motor Line	159
Adjustable V-Belts Are Easy to Couple and Uncouple	159
System Incorporates Automatic Tare-Weighing	161
Mast-Cylinder Assembly Ups Truck's Free Lift	161
Bulk Trailers for Citrus Fruits	163
Chemical Packages Cut Storage Space Needs	163
Improved Resin Cement Resists Acids, Alkalies	163

PRACTICAL IDEAS

Builds Own Case Sealer	5
Rejects Caps Without Liners	5
Cost-Board Cuts Waste	5
Blast-Cleans Grit Off Oven Reels	7
Eye Protection Assured at Grinder	7
Silent Truck Announces Approach	7
Equipment Down-Time Minimized	9
Uses Winter Weather for Cooling	9
Four Filling-Line Improvements	11
Easy Way to Variegate Ice Cream	13
Assuring Correct Fill	13

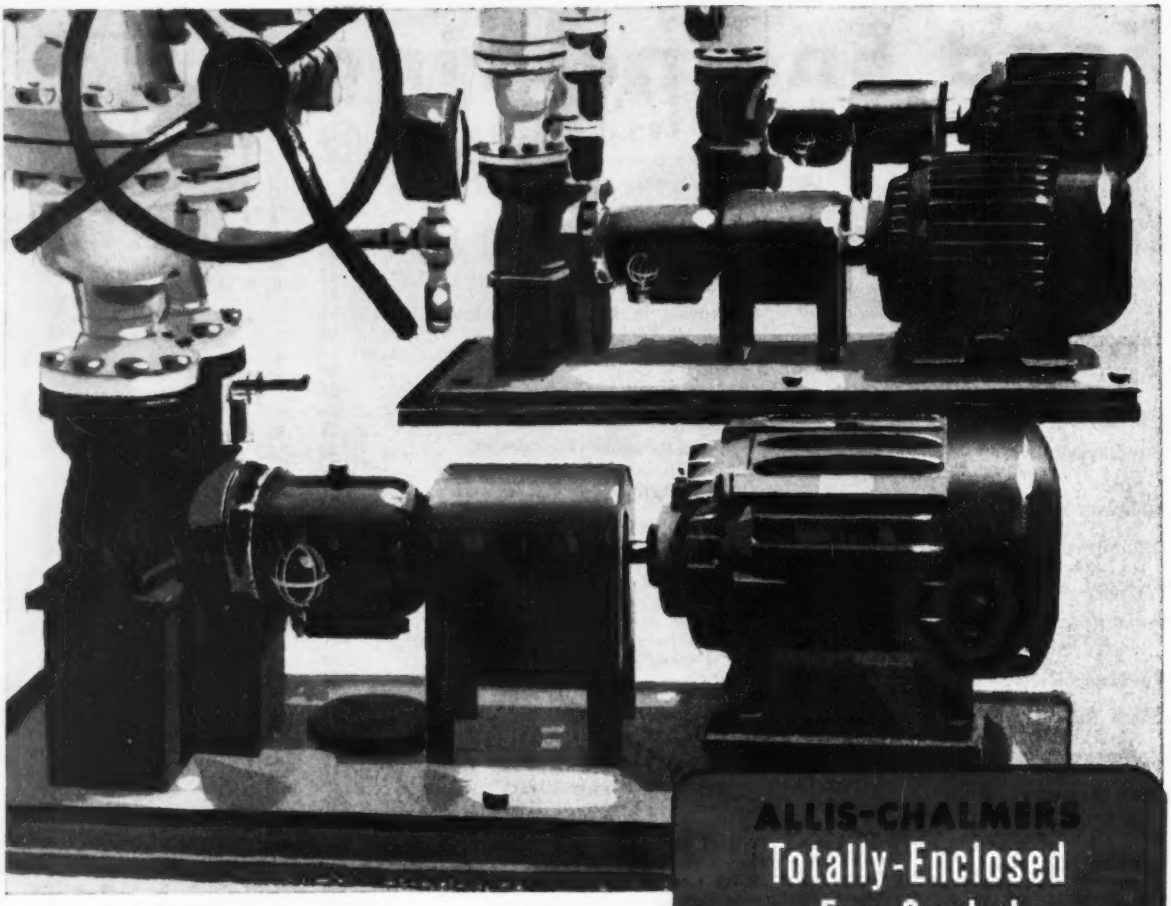
OTHER DEPARTMENTS

Letters to the Editor	59	Keeping Up With Field	221
In Behalf of Progress	164	Output & Price Index	222
New Packages & Products	170	Hors d'Oeuvres	223
Advances in Technology	177	Schedule of Events	234
Reader Service	179	Recent Inventions	251
Questions & Answers	194	Men & Companies	255
Useful New Books	218	Just Off the Press	260

Advertiser's Index 280

INDUSTRY INDEX

	Baking	Beverages	Cereals	Confectionery	Dairy	Fruits, Vegetables	Meats, Fish	Other Foods
"Taste Thermometer" Brings Food Quality Into Focus	•	•	•	•	•	•	•	•
Statistical Control Technique—Management's "Radar"	•	•	•	•	•	•	•	•
Suggestion System Pays Multiple Dividends	•	•	•	•	•	•	•	•
Electric Trucks Fill Gap in Process Line					•	•	•	•
Single-Product Benefits in Multi-Product Plant	•	•	•	•	•	•	•	•
Adds MSG Solution at Packaging Line Speeds						•	•	•
New Enzyme Tablets Benefit Both Product and Process	•							
New Units Attract Canners		•			•	•	•	•
Carload-to-Container Quality Control							•	•
Taking "Cake" Out of Sugar								•
Maintenance "Know-How"	•	•	•	•	•	•	•	•
Edible Oil Processing (Foldout Flowsheet)							•	•
Flexibles Are Revamping Package Pattern	•	•	•	•	•	•	•	•
Damage to Shipped Food and How to Avoid It	•	•	•	•	•	•	•	•
Bundling Frozen Foods Can Cut Costs						•	•	
How Kraft's Package Lab Works	•	•	•	•	•	•	•	•
One-Portion Packets Gaining			•		•	•		•
24 Low-Cost Devices Automate Package Line	•	•	•	•	•	•	•	•
Paper vs. Glass: "Where Do the Decimals Fall?"					•			
Floor Plans of Packaging Show	•	•	•	•	•	•	•	•
List of Exhibitors	•	•	•	•	•	•	•	•
Unit Accurately Fills 300 to 325 Cans Per Minute		•			•	•		
Retort Control System Is Highly Flexible			•			•	•	
Compact Fork Truck Has Boarding-House Reach	•	•	•	•	•	•	•	•
Paper Carton Filler for Smaller Dairy					•			
All-Aluminum Highlights New Control Center	•	•	•	•	•	•	•	•
Graders Employ New Fiberglas Shaker Pans					•	•		
Burner and Boiler Combination	•	•	•	•	•	•	•	•
Speed Variations Controlled Electronically	•	•	•	•	•	•	•	•
Sanitary Meat Mixer Has Tilting Bowl	•			•		•	•	
Compact Flow Regulator Is Easily Maintained	•	•		•	•	•		•
Sews Multi-Wall Bags at One or Both Ends	•		•					•
Overall Length Minimized on Powered Hand Trucks	•	•	•	•	•	•	•	•
Short Cab-Over-Engine Tractors for Maximum Loads	•	•	•	•	•	•	•	•
Hinged-Apron Conveyors Handle Numerous Items	•	•	•	•		•	•	•
Portable Unit Simplifies Electrical-Apparatus Checks	•	•	•	•	•	•	•	•
Telescopic Mover Takes Load on Stepped Levels	•	•	•	•	•	•	•	•
Power Up, Size Down in New Motor Line	•	•	•	•	•	•	•	•
Adjustable V-Belts Are Easy to Couple and Uncouple	•	•	•	•	•	•	•	•
System Incorporates Automatic Tare-Weighing	•	•	•	•	•	•	•	•
Mast-Cylinder Assembly Ups Truck's Free Lift	•	•	•	•	•	•	•	•
Bulk Trailers for Citrus Fruits						•		
Chemical Packages Cut Storage Space Needs	•	•	•	•	•	•	•	•
Improved Resin Cement Resists Acids, Alkalies	•	•	•	•	•	•	•	•
Builds Own Case Sealer	•	•	•	•	•	•	•	•
Rejects Caps Without Liners		•				•		•
Cost-Board Cuts Waste	•	•	•	•	•	•	•	•
Blast-Cleans Grit Off Oven Reels	•						•	
Eye Protection Assured at Grinder	•	•	•	•	•	•	•	•
Silent Truck Announces Approach	•	•	•	•	•	•	•	•
Equipment Down-Time Minimized	•	•	•	•	•	•	•	•
Uses Winter Weather for Cooling	•	•		•	•	•	•	•
Four Filling-Line Improvements	•		•		•	•	•	•
Easy Way to Variegate Ice Cream					•			
Assuring Correct Fill			•					
Letters to the Editor	•	•	•	•	•	•	•	•
In Behalf of Progress	•	•	•	•	•	•	•	•
New Packages & Products	•	•	•	•	•	•	•	•
Advances in Technology	•	•	•	•	•	•	•	•
Reader Service	•	•	•	•	•	•	•	•
Questions & Answers	•	•	•	•	•	•	•	•
Useful New Books	•	•	•	•	•	•	•	•
Keeping Up With Field	•	•	•	•	•	•	•	•
Output & Price Index	•	•	•	•	•	•	•	•
Hors d'Oeuvres	•	•	•	•	•	•	•	•
Schedule of Events	•	•	•	•	•	•	•	•
Recent Inventions	•	•	•	•	•	•	•	•
Men & Companies	•	•	•	•	•	•	•	•
Just Off the Press	•	•	•	•	•	•	•	•



ALLIS-CHALMERS
Totally-Enclosed
Fan-Cooled
MOTORS

Greater Protection Against Foreign Matter
Long-Life Bearings
Many Tried and Proven Features

new motors new values

For especially dirty, corrosive or hazardous applications, you will get top performance with low maintenance costs from the new Allis-Chalmers totally-enclosed, fan-cooled and explosion-proof motors in NEMA rerate sizes. Here are a few of the reasons why.

- *Foreign matter kept out of bearings and motor interior by double labyrinth seals inside and outside of bearings, and long running fits between shaft and seals.*
- *Bearing maintenance reduced because large grease chambers provide space for reserve lubricant; also, if required, grease may be renewed without dismantling.*
- *Easy to clean — no inaccessible air passages.*
- *Dirt wipes or blows off easily.*

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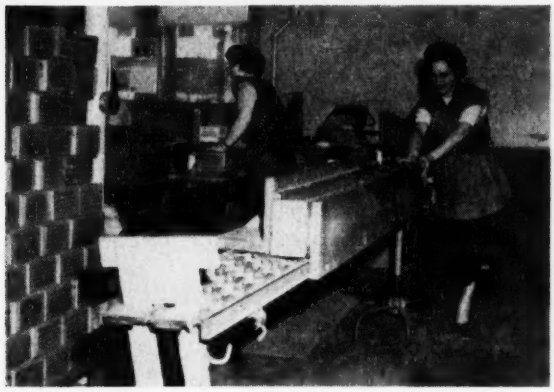
PRACTICAL IDEAS



First sealed case is . . .

. . . pushed out as new one goes in other end

Builds Own Case Sealer

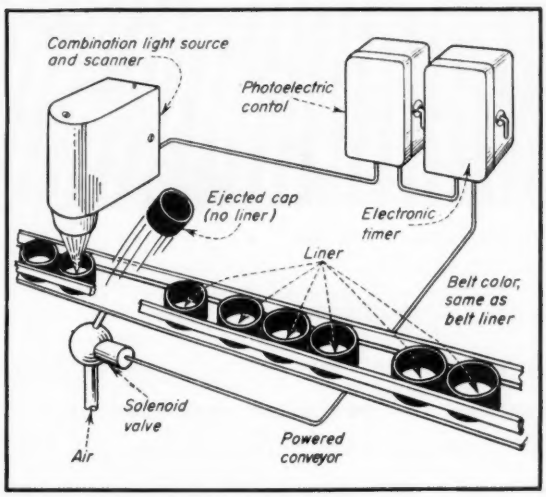
During the process of sealing cases at the rate of 1 per min. on each of our packaging lines, we found need of an inexpensive, yet serviceable sealer. There was none on the market, so we went about making one.

Here's how we went about building one for about $35.

Two boards (1x10 in.x6 ft.) were bolted at three locations with ¼ in. carriage bolts to a 10 ft. roller-wheel conveyor mounted onto two upright metal supports. Boards were mounted in a vertical position and 5 in. apart. One board is 3 in. higher than the other so that a ¼ in. round could be attached to hold top of shipping case in place.

Tension of the boards was easily adjusted by screwing a metal clamp attached to the top of the boards.

Friction of cases against boards was reduced in a simple manner. Attached to each board (on conveyor side) is a ¼x3 in. Masonite strip. Nailed onto each strip are two ¼x1 in. lengths of chrome-plated metal. In this way, only contact of cases that are hand-pushed through the custom-built sealer is along the four metal strips. Cases are pushed along the conveyor between the pressure boards after adhesive is applied manually to the flaps. And the cases are positioned on their sides so that the boards press against top and bottom to hold the top flaps down until the adhesive sets. —*Edwin Mason, President, Jim Weber, Production Manager, and D. S. Medrick, Engineer, Mason-Keller Corp., Roseland, N. J.*



Rejects Caps Without Liners

A reliable way to detect the absence of a liner in a bottle cap, and thus reduce the number of leakers, is to install a reflection-type photoelectric scanner.

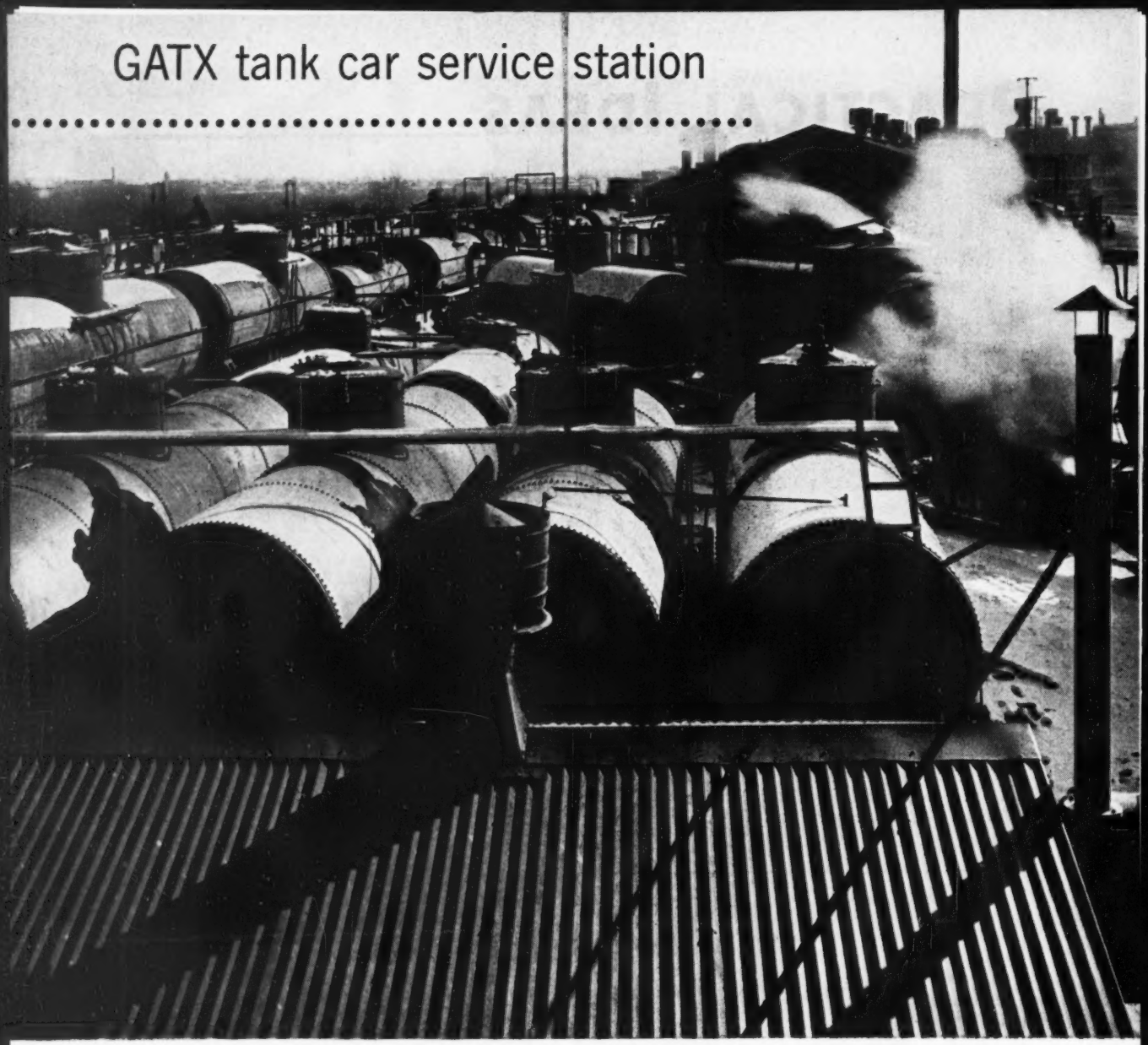
In one small unit (see sketch), the scanner incorporates both light source and phototube with a common lense system. As the caps move past in a continuous line, the scanner "looks" into the open ends, instantly recognizing the difference in reflection between liner and cap.

When beam detects a defective cap, the photoelectric relay operates a device (airblast control by a solenoid valve) to eject the faulty closure. Duration of the airblast is so accurately controlled by an electronic timer that none of the caps before or after the defective one are displaced. This high-speed photoelectric inspection system can keep pace with rapid production and provide 100 percent quality control at low cost.—*Photoswitch, Inc., Cambridge, Mass.*

Cost-Board Cuts Waste

Food plant workers, like people in general, sometimes are wasteful of things considered of small value. So small tools, such as hammers, goggles, and brooms frequently are

GATX tank car service station



Steam rack where 24 tank cars can be cleaned at one time

GATX tank cars are never more than a few hours away from "home base."

More than 30 General American repair shops give the 47,000 GATX tank cars their periodic steam-cleaning, lubrication, maintenance and inspection. Specialized equipment and parts inventories used in building more than 200 types of tank cars are also available for the repair and maintenance of the GATX fleet.

General American's experience gained in designing, building and operating railroad car fleets and shops for over 50 years gives shippers more dependable service for transporting liquids in bulk and greater flexibility of car types.

Car repair shops throughout the U.S.A.

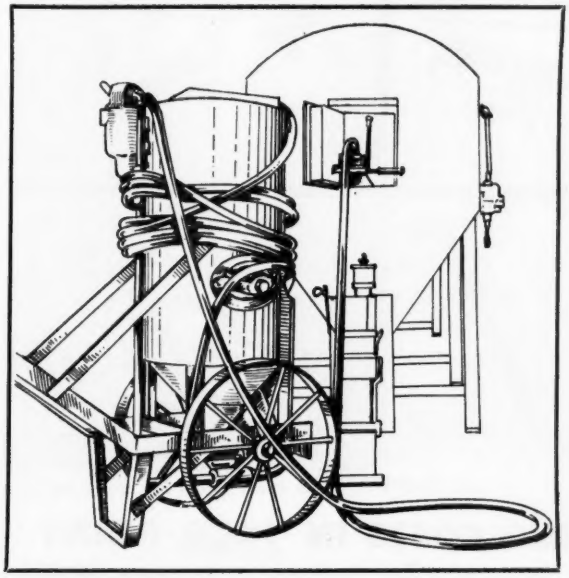
GATX GENERAL AMERICAN TRADE MARK

GENERAL AMERICAN TRANSPORTATION CORPORATION
135 South La Salle Street, Chicago 90, Illinois
Offices in principal cities

lost or mislaid. Also, supplies like paper cups and insecticide are wasted.

To impress upon workers the value of such items, Converted Rice Co., Houston, Tex., put a cost-display board on the plant wall near the entrance. The board was made of 4x6 ft. plywood with molding around the edges. The plywood was painted, several small items were permanently mounted on it with fasteners, and the cost of each item was prominently stenciled below the item.

This cost-display idea was effective for a few months, until its novelty value passed and it no longer attracted attention. However, it did make workers cost conscious and was particularly effective in cutting the waste of paper cups and insecticide.—*FE Staff.*



Blast-Cleans Grit Off Oven Reels

Cereal flake products at General Foods' Battle Creek plant are toasted in long perforated metal cylinders rotated inside of an oven enclosure. Eventually these cylinders or reels become coated with a very adherent black deposit that formerly was expensive to remove.

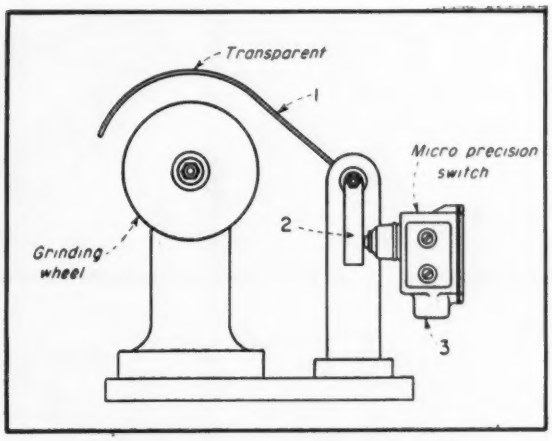
A number of methods were tried for removing this deposit. Usually reel was removed from the oven before cleaning attempts were made. In one case deposit was burned off with acetylene torch which, however, distorted the metal in the fabrication requiring as the result excessive maintenance for realignment.

Another method was high-pressure steam cleaning with sodium phosphate solution. This involved both the labor of removing and replacing the reel and also the cleaning up of the mess resulting from the mixture of deposit and condensate.

Now in use is a successful method using a sandblast machine in which the fines from company's product grape-nut flakes are used as an abrasive. Blasting nozzle is mounted mechanically along an arm that is temporarily supported inside the reel which, in turn, is rotated in its normal position in the oven.

After one or two traverses the operation is finished without metal distortion and without mess.

For other cleaning operations where contamination is not a problem, but where mild action is wanted, such things as sawdust, brown cornbobs and fly ash have been used very effectively.—*John Doyle, Foreman, and Dan Joba, Plant Sanitarian, General Foods Corp., Battle Creek, Mich.*

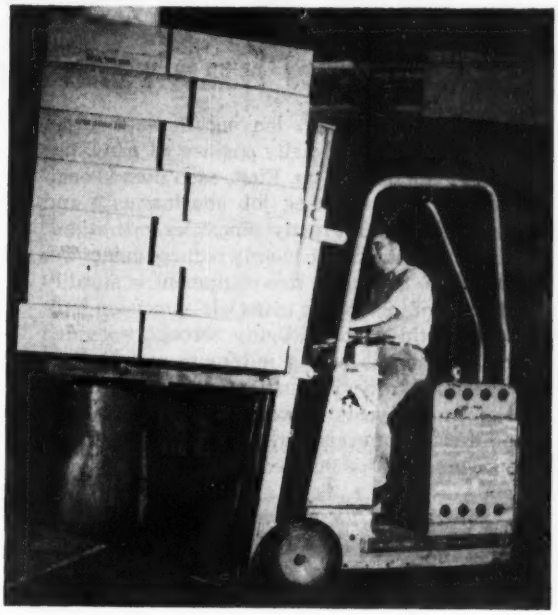


Eye Protection Assured at Grinder

To provide adequate protection to workers' eyes in operating a grinding wheel, first form a sheet of Plexiglas —(1) in sketch—into a protective cover formed over the wheel as a semi-transparent shield.

Then attach this sheet to a shaft, to which a lever (2) is attached so that when the protective cover is lowered over the wheel the lever closes the circuit in a micro-switch (3).

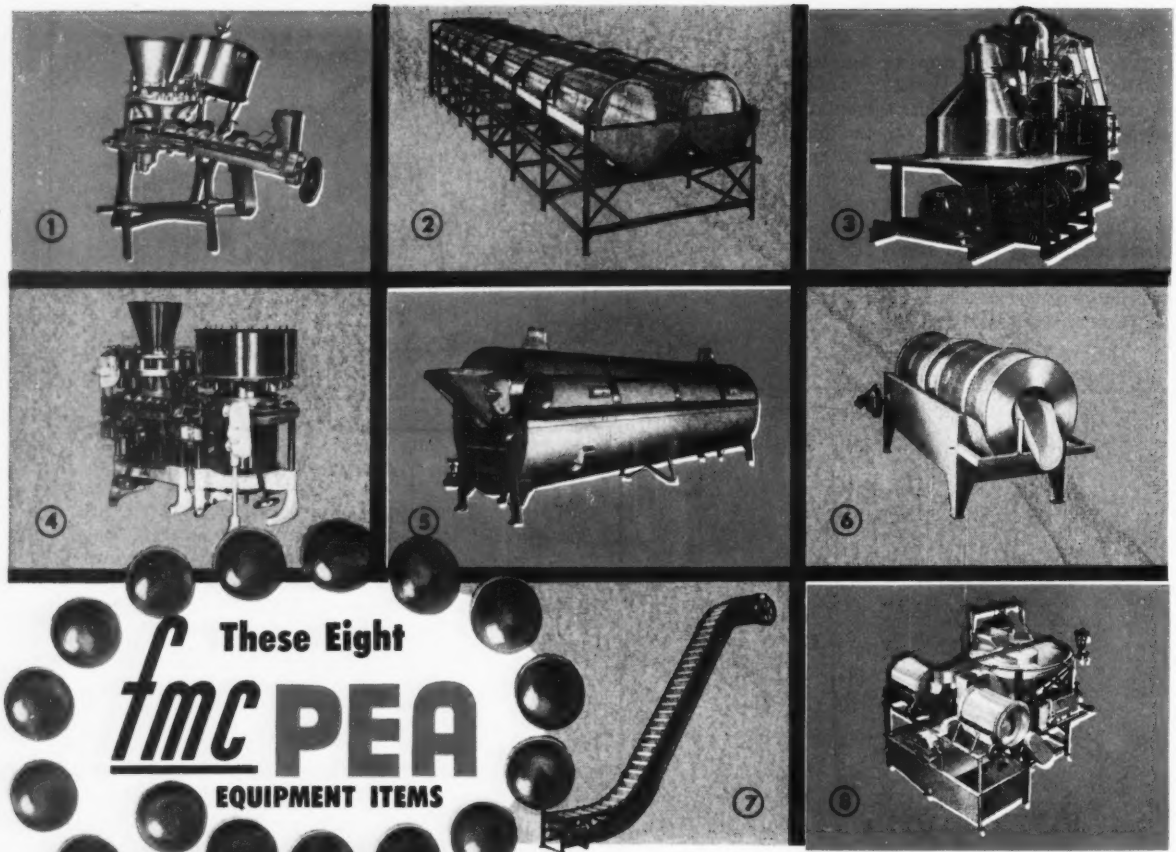
This switch serves as starter for the motor. When the cover is raised motor circuit is interrupted and the grinding wheel stops, starts only when the cover is in protective position.—*Micro Div., Minneapolis-Honeywell Regulator Co., Freeport, Ill.*



Silent Truck Announces Approach

The noiseless movement of an electric truck in the plant and especially in a quiet area of the warehouse is an imminent accident hazard. Several means may be employed to lessen this danger.

A horn or bell may be added to the truck to be sounded by the operator as an alarm at the approach of all intersections or at any location where a worker may step into the path.



These Eight fmc PEA EQUIPMENT ITEMS

CAN HELP TRIM RISING COSTS IN YOUR PLANT

If you pack peas and are looking for ways to cut costs, see what this specially engineered FMC pea equipment can do for you. First, each item is engineered to do an exacting job continuously and automatically. This greatly simplifies operations, speeds up output, and frequently reduces manpower requirements. Secondly, this equipment is sturdily constructed of high-grade materials—precision-built to run smoothly and efficiently through extended heavy-load periods with a minimum maintenance factor. And thirdly, its outstanding design, developed over many years, provides the gentle handling essential in maintaining the high quality established by the canner for his finished product.

Write for full information or call your nearest FMC representative

Specially Engineered - Keyed to the particular needs of pea packers

1. **FMC 8-STATION PEA & BEAN FILLER**
   Automatically measures and fills the product, then adds brine to a highly accurate measure. Handles up to 180 CPM, depending on can size.
2. **FMC TWIN REEL PEA GRADER**
   Features patented FMC "Cloverleaf" screen for increased output, more accurate sizing without damage to peas. Supplied with any number of sections desired.
3. **KEY FROTH FLOTATION CLEANER**
   Designed for selective and automatic separation of waste and foreign material from the product. Unmatched efficiency at a capacity up to 8,000 pounds of peas per hour.
4. **FMC 15 STATION PEA & BEAN FILLER**
   New and unique in design, these twin units achieve a rare combination of accuracy plus high capacity (up to 380 CPM—211 x 304) with their carefully calibrated measuring pockets and overflow brimer principle.
5. **FMC BLANCHER**
   Available in 8 to 18 ft. sizes, according to length of blanch required. Has highest capacity per floor space, is easy to install and clean, and is economical in steam and power requirements.
6. **FMC ROTARY PEA WASHER**
   Extremely simple and effective, smooth in operation, absolutely sanitary and easy to clean. Pressure lubrication gives long, trouble-free bearing life. Handles peas and many other products.
7. **FMC GOOSENECK CONVEYOR**
   Positive interlocking buckets form continuous conveyor with large capacity for peas, beans and other granular products. Built in any even-foot length.
8. **FMC (LEWIS) QUALITY GRADER**
   Efficient separation of two grades of peas, sinkers and floaters, through the specific gravity principle. Triple-reel discharge thoroughly separates peas from brine and trash.

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Canning Machinery Division

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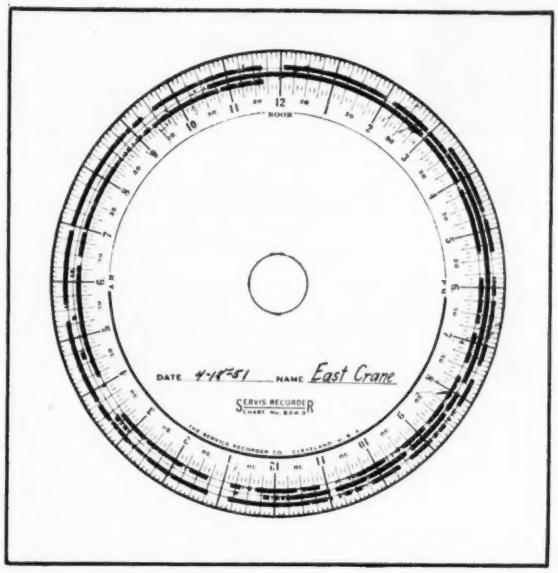
Such devices, however, divert the attention and effort of the truck operator and also emit a distracting nerve-jarring noise.

Simple and effective method of announcing the truck's approach with a sound which is not objectionable is to place used ball-bearings inside the truck's hub caps. The result is a gentle jingling sound that workers readily recognize as signalling the approach of the vehicle.—*D. W. Niven, Lewis-Shepard, Watertown, Mass.*



Equipment Down-Time Minimized

When it can be determined how often, when, and for how long material handling equipment or equipment on a production line is idle, planning is then possible to avoid lost production time.

A problem of this type involving materials handling equipment at Atlantic Gelatin Div. of General Foods Corp., recently occurred.

To obtain valuable and pertinent information on the causes of the down time, an instrument was needed to record on a 24 hr. basis, periods of operation and periods of idleness for gasoline driven lift trucks and electrically driven overhead cranes.

A recorder was secured to each piece of equipment in question.

The recorders used for this job, made by Servis Recorder Co., Cleveland, were remarkably simple, consisting merely of a stylus which is allowed to vibrate with any motion of the equipment, and thereby etch the surface of a wax coated chart operated by a mechanical clock.

The chart then shows periods of operation and periods of down time, which are quickly summed up by a simple integrating device.

Instruments were easily installed and recorders are small, compact and inconspicuous. Only attention required is to wind the clock and replace the chart. The stylus can etch up to three separate and distinct 24 hr. records in one 24 hr. chart when desired.

When it was learned that the equipment was not being used to a maximum, it was decided to keep a log to trace down all wastage.

The result of this log has been the elimination of or at least the accounting for, any and all down times in every important unit of plant equipment.—*L. F. Garono and A. E. Ring, Atlantic Gelatin Div., General Foods Corp.*

$50 Extra for Best Item

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month, you will get an additional payment of $50.

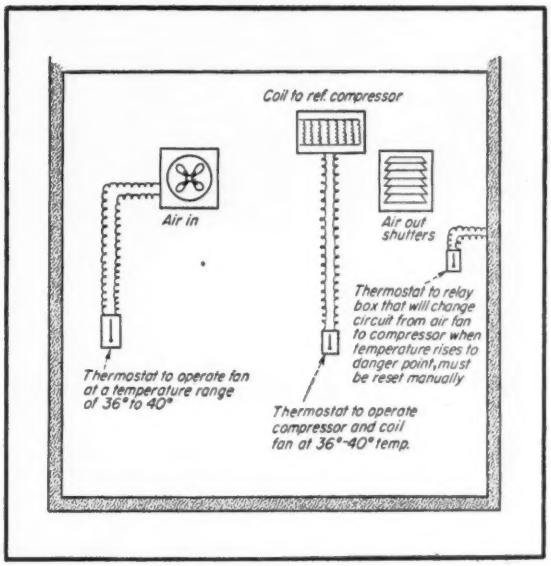
Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

JANUARY PRACTICAL IDEA winner was "Water Fog Reduces Sugar Handling," submitted by Henry Rente, Maintenance Superintendent, Kauai Consolidated Terminals, Ltd., Nawiliwili, Kauia, Hawaiian Islands. It described how spraying of atomized water has reduced troublesome sticking of sugar on ship-loading conveyor belts.


Coil to ref. compressor
Air in
Air out shutters
Thermostat to relay box that will change circuit from air fan to compressor when temperature rises to danger point, must be reset manually
Thermostat to operate fan at a temperature range of 36° to 40°
Thermostat to operate compressor and coil fan at 36°-40° temp.

Uses Winter Weather for Cooling

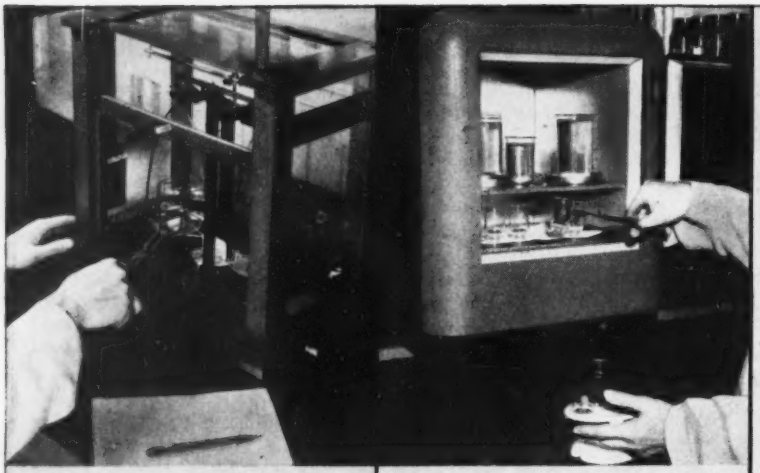
We lower the cost of refrigeration during winter months by employing outside temperatures for cooling.

Here's how we use natural cold without taking any chances on weather changes.

First of all the room or cooler to be refrigerated must have an exterior wall or else some means, such as a duct, for bringing in cold air from the outside.

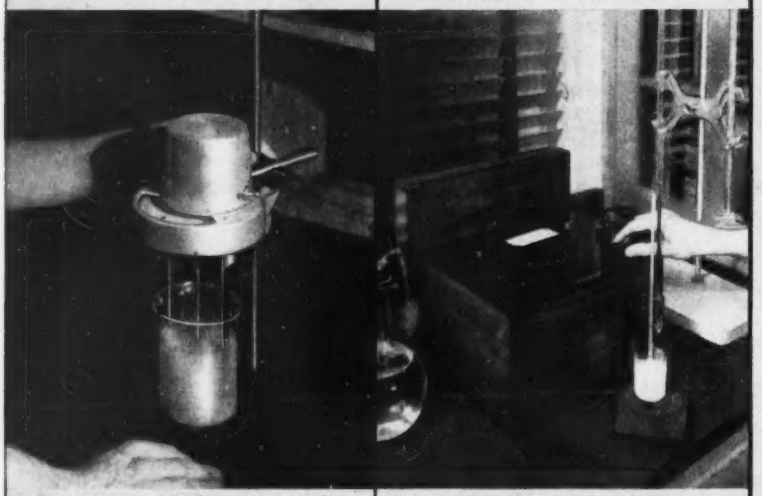
A fan (see sketch) is provided to draw in outside air. A shuttered opening is also provided through which room air may be exhausted. Shutters are closed when the fan system is not operative.

Fan motor is controlled by thermostat set to operate



Accurate weighing of raw material samples preparatory to quantitative analysis.

Thermostatically controlled drying oven used in one test to assure high purity standards of raw materials.



Operating a Brookfield Viscometer used in control tests of viscous adhesive products.

Determining the pH of a dextrine by means of a glass electrode potentiometer.

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PAISLEY'S SCIENTIFIC LABORATORY CONTROL OF MANUFACTURE INCLUDES TESTS FOR THE FOLLOWING QUALITIES AS REGULAR PROCEDURE:

- Tests of raw materials
- Proper proportioning of ingredients, order of admission to the batch, mixing speed, temperature of cooking, conversion time and cooling.
- Standardization of viscosity
- Standardization of body
- Solid content (Specific Gravity)
- Cohesive spread (Machinability—Brushability—Sprayability, etc.)
- Emulsion stability
- pH Control
- Uniformity of color
- Drying time
- Duration of "tacky" state
- Bonding strength (on materials to be joined) —Wet bond strength—Dry bond strength
- Non-Warp qualities (when required)
- Penetrating qualities
- Coverage per gallon
- Storage life
- Aging qualities
- Water resistance (when required)
- Climate resistance (heat, cold, relative humidity—when required)
- Flexibility (when required)
- Stiffness—Brittleness (when required)
- Selection of proper shipping container (glass, tin, wood, lined drum, etc.)

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The PAISLEY scientific selection of Adhesives has saved up to 25% on some manufacturing and packaging costs. Chances are we can help YOU to realize new profit from your adhesive operations by saving waste, increasing production speed and cutting costs.

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Write for our "Adhesive Operation Data Sheet"—Return it promptly with all information asked for. This Data Sheet is your guide to getting the ONE best, most efficient Adhesive for the specific operation you describe. Trial shipment will be sent ON APPROVAL if desired. This skilled laboratory service does not obligate you. It's the SURE . . the MODERN *way to buy Adhesives!*

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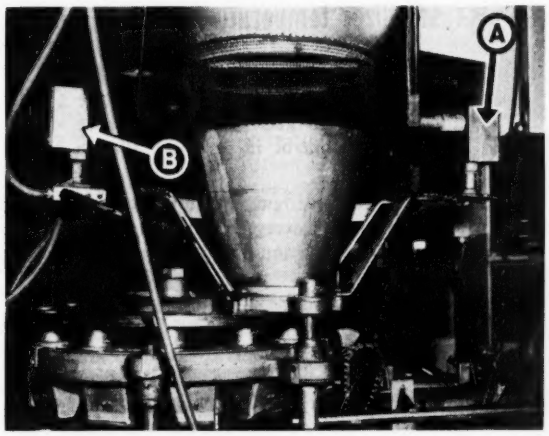
within a temperature range of 36-40 deg. F. Refrigeration system which keeps cooler temperature lowered during the summer months is also wired to a thermostat set for the same temperature range.

Finally, a third thermostat is provided to connect to a relay to change over source of cooling from fan to the plant refrigerating system if a temperature rise in the cooler approaches a dangerous level.

Manual setting of this third thermostat is required to convert the cooling system back to the fan bringing air from the outside. Considerable saving in refrigeration costs results when such a system is employed—*Joseph J. Seavella, Cooperdale Dairy, Inc., Skaneateles Junction, N. Y.*

Four Filling-Line Improvements

Inexpensive and readily installed attachments at four locations on the carton-filling line at Seabrook Farms Co., Bridgeton, N. J. have reduced required labor and held line down-time to a minimum.



1. Uniform Feed Assured

Maintaining a static head on our filling machine bowls is necessary to control accuracy of carton fill. At the high speed at which fillers operate (275 per min.) controlling product level accurately by manual operation of vibrator feed became impossible.

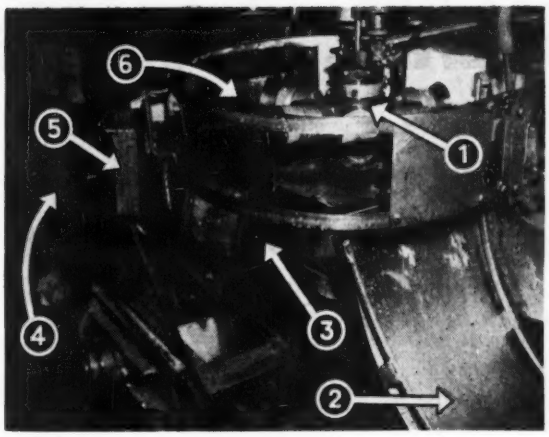
However, when an electric eye beam sender–(A) in photo—and receiver (B) were installed to regulate product level in the feed hopper, variations in static head became insignificant.

When beam is interrupted by product, the vibrator feed is stopped, and started again the instant the level of the product is lowered sufficiently to restore the beam.

This system proved entirely satisfactory when products were filled into packages before freezing. However, some products can only be packaged after freezing. Among them are succatash, mixed vegetables, etc.—frozen items prepared from products grown and frozen in different seasons.

When these already frozen and mixed products were packaged, the screen above the filling bowls frosted over. When this happened the photoelectric beam was permanently interrupted and feed of vegetables to filler hopper stopped.

This hindrance was avoided by installing ¼ in. copper tubes with two, 5/32 in. orifices directing air against the screen in the areas through which the electric beam passed. A solenoid actuated valve shuts off the air whenever the filling machine is stopped.

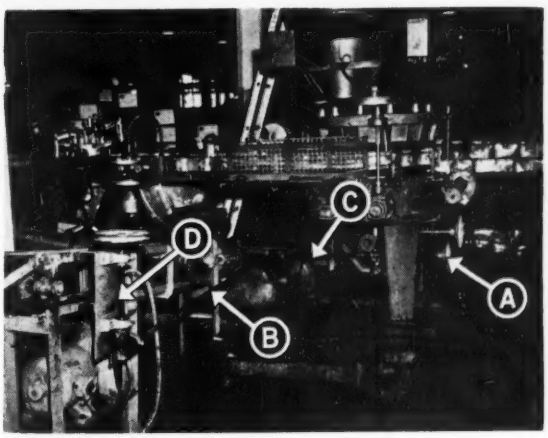


2. Carton Transfer Improved

Filling at twice the speed of the wrapping, feeds to a rotary carton line divider—(1) in photo. Here every other carton drops into a chute (2), remainder into a chute (3) on the opposite side of the divider, for transfer onto conveyor (4), thence to the wrapping machine.

In the past, when a package became engaged or jammed in the divider, many following packages were subsequently smashed and piled on the machinery, as well as on the floor, before the filler could be stopped.

Now, however, a sensitive switch (5) has been attached to the guide-rail of the divider, actuated by a curved hinged strap (6). The latter is forced against the switch to stop filler motor whenever a jammed condition starts. This has eliminated the previous pile-ups, and cut material loss to a minimum.



3. Remote Rate-of-Fill Control

Package check-weighing station, located along conveyor from filler to wrapper is far away from the control wheel—(A) in photo—which regulates the volume of fill. When adjustment was necessary someone had to be summoned to regulate machine.

To correct this condition a shaft (B) with gears mounted on both ends has been installed to connect fill-controller shaft (C) on the filler with a short vertical shaft and wheel (D) conveniently located at the check-weighing station.

Check weigher can now regulate the fill of cartons by adjusting wheel that remotely controls volume of fill.

STEAM...is only as good as you use it!

Use steam the right way to reduce production costs, improve product quality and output—

When production slow-downs, high costs, and poor product quality occur, don't always blame the process equipment — often the fault is in *the way steam is used.*

For example, waterlogging caused by improper trapping or poor steam circulation, seriously affects heat transfer, reduces output, and creates production bottlenecks. Improper air venting does the same. Poor temperature control can lower product quality, cause rejects and further raise production costs.

If your plant is suffering from any of these production handicaps, Sarco can help you.

Plant after plant has benefited from Sarco's experience in the process industries. The complete line of Sarco steam traps and temperature controls enables Sarco engineers to offer impartial, expert recommendations on how to make steam work best in your plant.

Why not call on Sarco for engineering recommendations next time you need help. For case histories describing how other plants in your field solved similar problems, write today to Sarco Company, Inc., Empire State Building, New York 1, N.Y.

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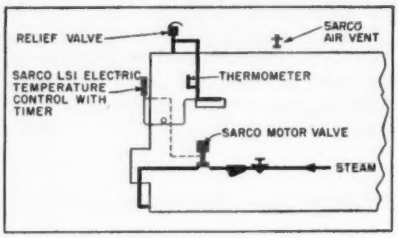
improves product quality and output



Combination temperature controller and air vent hook-up

How to achieve accurate, low-cost sterilizer temperature control

The Chocolate Products Company, Chicago, makers of KAYO, famous chocolate milk drink, now gets accurate, low-cost temperature control in its Fort Wayne Sterilizer.

PROBLEM: Manual temperature control of sterilizer caused excessive product spoilage and waste of man hours to check and adjust temperatures.

SOLUTION: The time-temperature control hook-up above. High capacity air vent eliminates air-steam mixtures which are often 20° F below steam temperature; permits sterilizer to fill quickly with pure steam. When proper temperature is reached, controller actuates timer and temperature is maintained for required length of time.

RESULTS: Required temperatures held to within plus or minus one degree. Time needed for effective sterilization reduced.

Many bottling and canning plants are turning to this inexpensive Sarco hook-up for more efficient sterilizing. Write for details and a complete hook-up sketch.

Sarco Electric Temperature Controller is accurate and inexpensive. Holds temperatures to ±1° F. Setting easily changed by turning one knob. Ask for Bulletin 1025.

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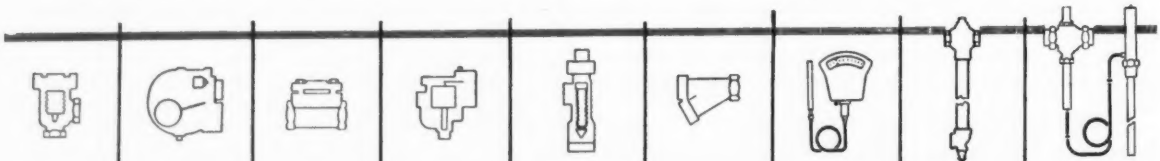

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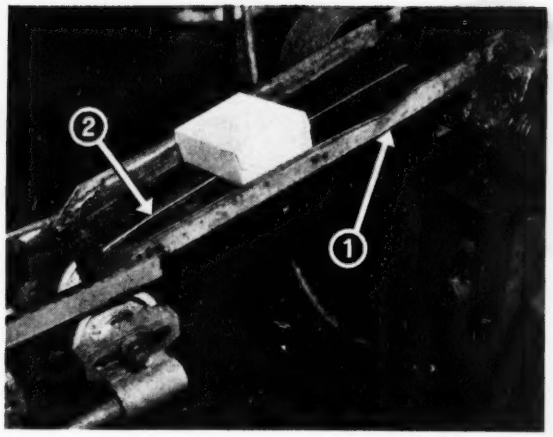
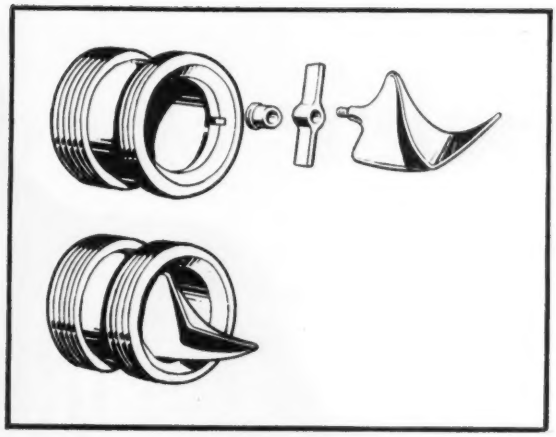


4. Carton Transfer Improved

Bridging two belt conveyors which effect the transfer of packages from the filler to the wrapping machine is a chute—(1) in photo. Formerly, friction between packages and chute occasionally was sufficient to slow the high-speed flow, causing an overflow of packages onto the floor.

This condition was overcome merely by attaching a spring wire (2) down the center of the chute to elevate the cartons from chute surface. Friction is thus reduced and pile-up no longer occurs.—*Morio Shemomura, Packaging Supervisor, Seabrook Farms Co., Bridgeton, N. J.*

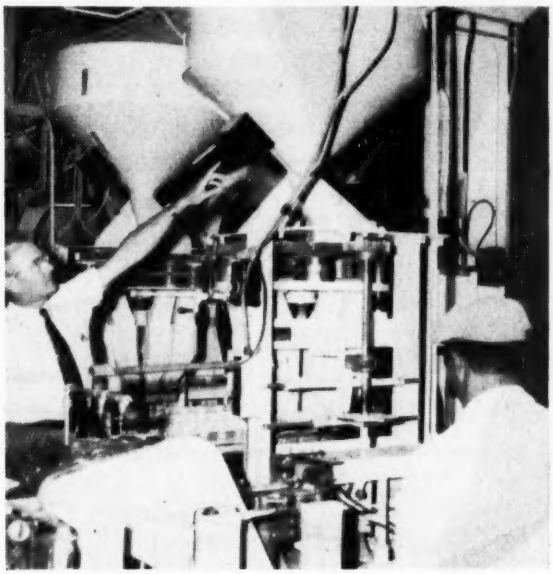


Easy Way to Variegate Ice Cream

A simple sanitary and effective device, a spinner (see sketch), when inserted in an ice-cream line provides a variegated effect when variously colored ice creams are forced past the spinner.

One advantage of this device is that it prevents coring of colors which sometimes occurs with variegated ice cream.

When connected in the line from two, three or four-freezers by a No. 10 sanitary cross, spinner does an excellent job. Merely attach it to the discharge end of the cross.—*"Cherry-Burrell Circle," Cherry-Burrell Corp., Chicago.*



Assuring Correct Fill

Simple devices solve two packaging problems in the plant of Converted Rice Co., Houston, Tex.

One is a photoelectric minimum-level control on the hopper of the rice carton filler. It shuts the machine down when the rice drops so low in the hopper as to cause partial fill as a result of too little product "head", or pressure.

This control involves the placement of a light source near bottom of the hopper (see photo above), to project a beam across the rice in the hopper at minimum level. Then a photocell is mounted on the hopper directly opposite the light source, both the cell and the light being on the outside of the hopper and working through small windows.

As the rice level falls below the light-source level, the light beam strikes the photocell, which in turn actuates a relay to stop the packaging machine.

A second device prevents excess feed of a certain grade of rice by blending a small quantity of it with the main rice stream. This is a solenoid-operated slide valve in the gravity chute which discharges the blending rice into the constant-speed, main-stream, screw (see photo above).

Normally, the solenoid holds the slide valve open. But should the packaging line stop, the solenoid—wired into the packaging machine circuit—lets the slide close and thereby prevents pile-up of the blending grain in the main-stream conveyor.—*FE Staff.*

For more information, use coupon on page 179.

Facts For Fence Sitters

about your potential for dietetic foods

EVEN THE EXPERTS ARE SURPRISED at the quick and enormous growth of dietetic products. Sales last year hit an all-time high. And—volume is continuing to grow—fast!

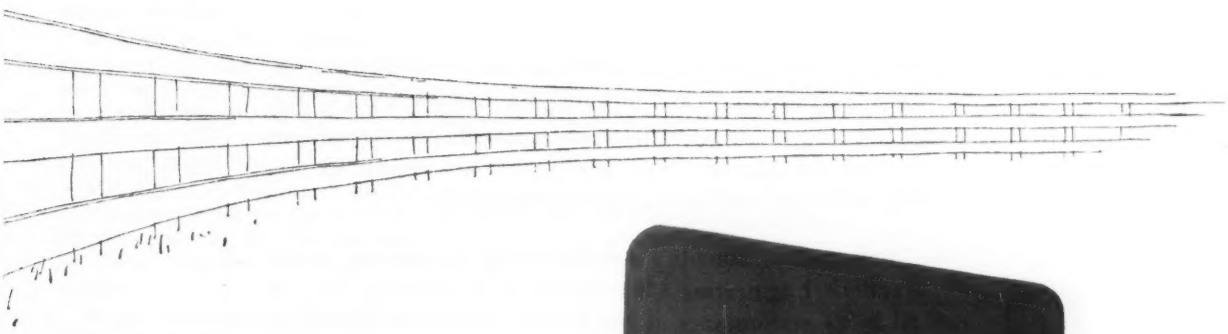
IT'S GROWING BIGGER because the market is big. In addition to approximately one million known diabetics, there are an estimated 35 million Americans who are overweight. These millions represent a big ready-to-buy market for dietetic foods.

SUCARYL OPENS WIDE THE FULL DEVELOPMENT of this market because it is a new discovery in the field of non-caloric sweeteners . . . with new advantages to consumers and processors. SUCARYL leaves no bitter after-taste. It stays sweet throughout your processing operation.

SUCARYL IS KNOWN TO MILLIONS. Through widespread publicity, SUCARYL already enjoys vast public recognition and acceptance . . . a valuable consumer franchise for you.

AND, INCREASED PROFIT IS POSSIBLE because of this acceptance and public need. Based on the general retail price for dietetic foods, many processors are realizing substantially higher profits than obtainable on ordinary lines.

You who are on the fence about dietetic products may find these facts helpful in making your decision to enter this rapidly growing, profitable field. We welcome your inquiry. Write Chemical Sales Division, Abbott Laboratories, North Chicago, Illinois. Abbott



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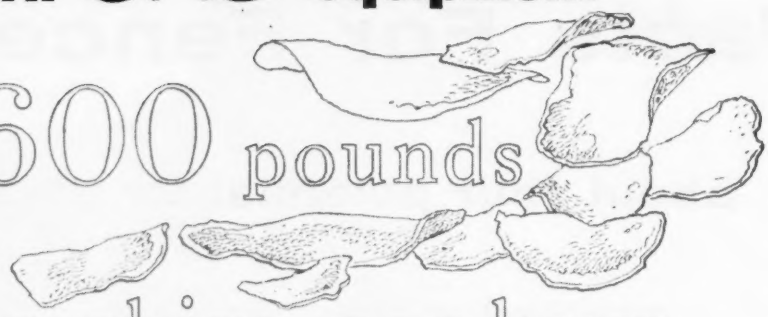
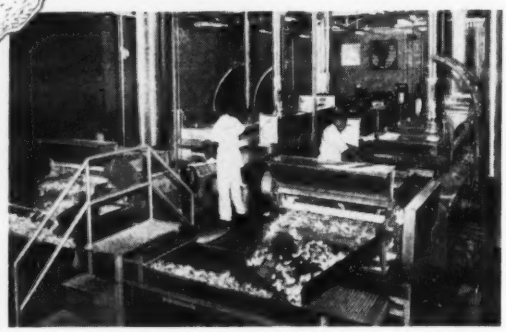
modern GAS equipment



fries 600 pounds of potato chips per hour

at Morton Foods plant, DALLAS, TEXAS



At Morton Foods' new plant in Dallas, the most modern GAS equipment available is used for the manufacture of potato chips. The modern GAS machine and its storage tank contain 3500 pounds of cottonseed oil, which Gas-fired tubes, immersed in the oil, heat to 350° F. Each tank in the processing machine contains five heating tubes, which are controlled automatically, shutting GAS off whenever flue motor stops.

Temperature of the cooking pan bottom is so controlled that it is never overheated. This prevents carmelization of chips which fall onto it. An automatic filter permits filtering of hot oil through the storage tank, and immediate return to the cooking vats, and simplifies evening clean-up.

This Modern GAS Volume Food Processing Equipment, made by MacBeth Engineering Corporation of Harrisburg, Pa., is typical in its performance of the service you can expect from GAS. Gas is clean, Gas is versatile in application. Temperatures are controllable exactly for critical food processing. Get the facts from your Gas Company Representative.

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And almost as fast as you get the answer, you can get the steel you need. For many of the REZISTAL stainless steels shown on the Selector are carried in stock in Crucible warehouses conveniently located throughout the country.

To get your free copy just fill in and mail the coupon. Better do it now.

HOW THE SELECTOR WORKS:

Start with the problem. For example, resistance to corrosion in contact with copper sulfate. Just set the slide at the proper index number shown on the Selector (in this case on the back), and you have the answer in a second – grades 302 and 316 are fully resistant to this form of attack.

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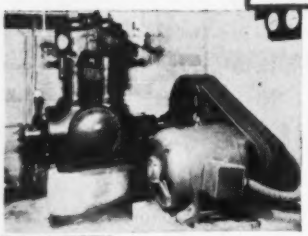
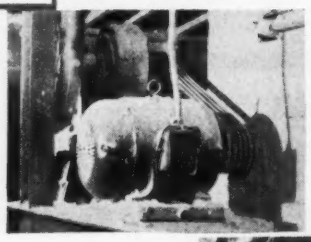
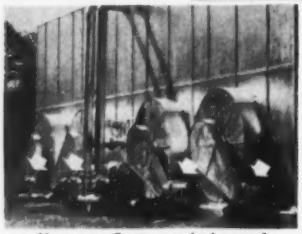
Century C MOTORS

Here is a motor on a refrigeration compressor in a nice clean room. An open type Century general purpose drip proof motor is therefore used.



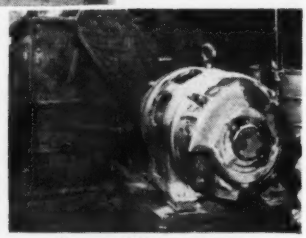


Century 5 horsepower totally enclosed fan cooled motor drives a mixer in a processing plant.



Here are Century splash proof motors driving fans out in the open, without any protection.

When Your Production Hits a Peak...



Century 200 horsepower motor driving a hammer mill used to crush feed.

Century MOTORS Have STAMINA

The extra ruggedness built into every Century motor is your protection against unforeseen operating conditions.

Leading manufacturers of conveyors, pumps, agitators and many other types of processing equipment rely on Century motors to assure top performance of their products. Motors can be selected from the complete Century line to meet a wide range of power requirements and atmospheric conditions—

- *400 to 1/8 h.p.*
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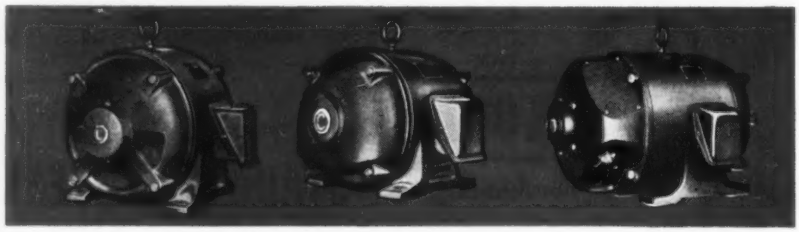
- *Drip Proof, Splash Proof, Dust Proof and Explosion Proof frames*
- *Optional corrosion-resistant features*
- *Constant speed, multi-speed, adjustable varying speed and adjustable speed in fine steps over a wide range*
- *Gear motors*

For performance you can depend on specify Century motors on your new equipment, or for replacement. Your nearby Century Sales Office or distributor is always at your service.



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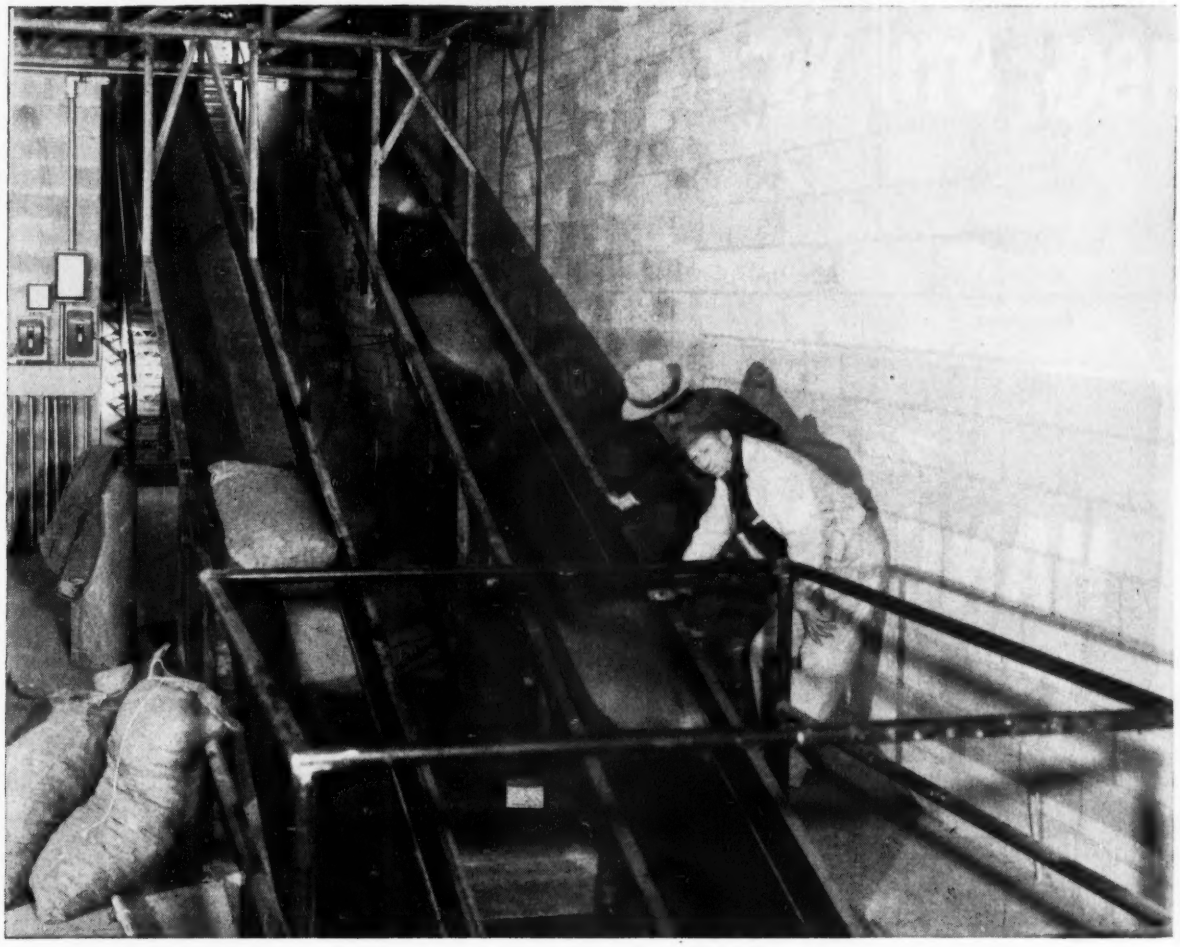
RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



100-pound bags climb three stories high on rubber

A typical example of B. F. Goodrich improvement in rubber

RUSHING up that steep grade are hundred-pound sacks of cattle feed. But getting them three stories high, to the shipping dock, was once a problem.

The feed company knew that a sharp incline like this would save space and speed handling time. But at this angle, the sacks would usually slip down faster than the moving rubber belts could carry them up. So longer, slower, more expensive conveyors, with a gradual rise, had to be used.

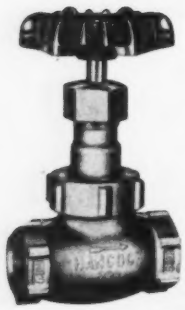
B. F. Goodrich engineers had made scores of improvements in conveyor belts, and were determined they could do something with this problem, too. Out of many ideas came the B. F. Goodrich Ribflex belt. It's made with parallel ribs that are cross cut into thousands of flexible grip blocks—more than 5700 to the square foot. The tiny, self-cleaning rubber blocks are tough enough to stand years of use, yet soft so they bend just enough to grip anything carried by the belt and move it easily, quickly, without a slip.

The improved B. F. Goodrich belts were put to work at the much steeper angle you see here. Now 1200 sacks an hour make the three-story climb without a slip or slide. And, what's more, these belts will keep their gripping power long after rough-surface belts would become worn and ineffective.

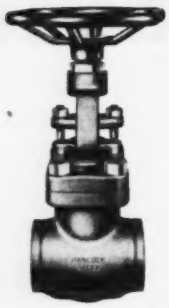
The Ribflex belt is typical of B. F. Goodrich research which is constantly at work improving all kinds of belting, hose and other rubber products and finding new ways to use them better. Don't decide any rubber product you may buy is the best to be had without first finding out from your BFG distributor what B. F. Goodrich research may have done recently to improve it. Or write *The B. F. Goodrich Company, Dept. M-196, Akron 18, Ohio.*

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

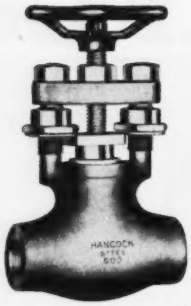
For more information, use coupon on page 179.



150#, 200# and 300# Bronze Globe, Angle and Check Valves



800# Steel Gate Weldvalves



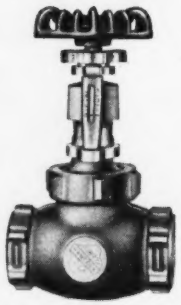
600# Steel Globe and Angle Weldvalves

1500# and 2500# Steel Globe and Angle Weldvalves

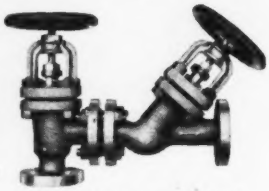
there's a

HANCOCK VALVE

FOR YOUR TOUGHEST SERVICE REQUIREMENTS



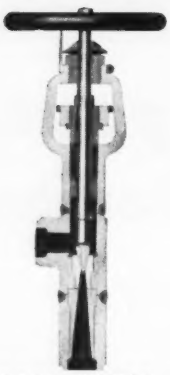
150# and 300# Bronze and 600# Steel "Flocontrol" Valves



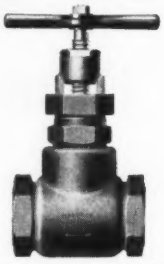
300#, 600#, 1500# and 2500# Boiler Blow-Off Valves

Illustrated are some of the many fine Hancock Valves that contribute substantially to the high efficiency of plant operation and the low cost of valve maintenance. By anticipating the changing needs of expanding industry, Hancock has — since 1877 — pioneered the development of many different types of valves. Today, the outstanding quality and superior performance of Hancock Valves continue to surpass practically every job requirement, regardless of the demands of service. Yet, despite their long, trouble-free life, Hancock Valves cost no more than ordinary valves.

When Hancocks go in, valve costs go down



600# through 1500# Hi-Pressure Drop Weldvalves



300# and 600# Cast Steel Globe, Angle and Check Valves

FAST SERVICE IS YOURS through your nearby Industrial Supply Distributor. He stocks a wide selection of Hancock Valves to meet the diverse requirements of all industry. You can rely on his recommendations to help you obtain the best valves for your applications.

HANCOCK VALVES

A product of **MANNING, MAXWELL & MOORE, INC.** Watertown 72, Massachusetts

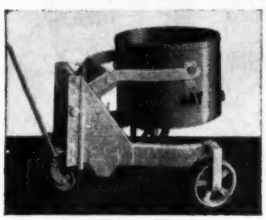
MAKERS OF 'HANCOCK' VALVES, 'ASHCROFT' GAUGES, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN' INDUSTRIAL INSTRUMENTS, AIRCRAFT PRODUCTS. BUILDERS OF "SHAW-BOX" AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES.

DAY means longer life span

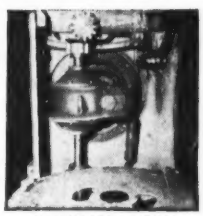
DAY 100-gal. gearless type pony mixer at Eli Lilly & Co., Indianapolis, Indiana

✲DAY combines rugged construction with precision engineering. That's why DAY Pony Mixers are delivering *extra* years of trouble-free, economical operation in plant after plant. DAY features result in higher production at a lower cost, protect the quality and uniformity of your product. An important feature is the interchangeable can unit—eliminates delay between batches. Lift truck with hand pump hydraulic lift unit is optional equipment. DAY planetary mixing action plus agitator blade contouring delivers radial and lifting mixing action over depth of can. DAY rugged construction is unique. A one-piece heavy cast iron frame assures absolute rigidity, quiet operation. Mixers are driven by time-tested internally geared head motors through roller chain and sprockets enclosed in dust tight guards, exclusive with DAY. Whatever your requirements, there's a dependable DAY pony mixer engineered to do your job — better — more economically. For complete information, call your nearest J. H. Day field engineer, or write direct for Bulletin 500.

RUGGED CONSTRUCTION



INTERCHANGEABLE CAN



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New counter-current extractor gets more flavor out of coffee

... with help of TIMKEN® bearings

HERE'S a new wrinkle in the making of soluble coffee: The Vulcan-Kennedy Solvent Extractor, manufactured by the Vulcan Copper & Supply Company, Cincinnati, Ohio.

In this machine, the ground roasted coffee enters the extract near the extract discharge end of the machine, and the coffee solids are carried counter-current to the liquid flow. The weaker the coffee grounds get, the hotter the water becomes. Hot water is introduced at the opposite end where the extracted grounds are discharged. This process gets the maximum flavor out of the grounds.

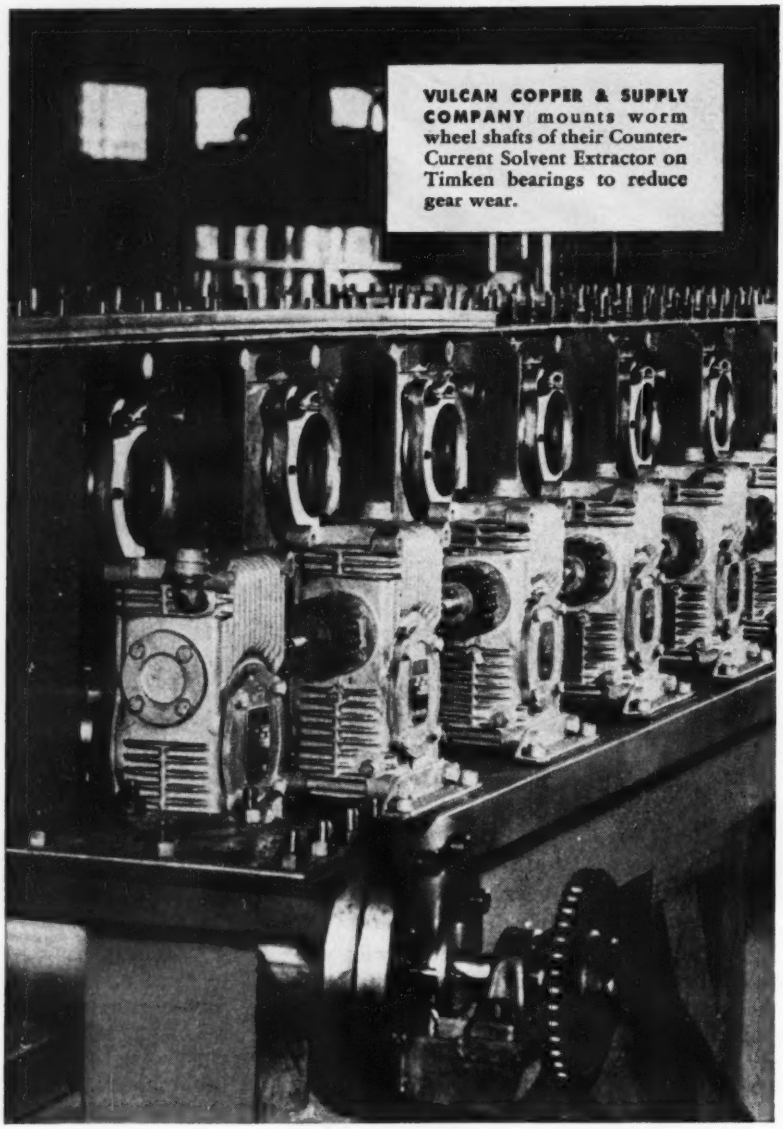
The grounds are powered through the water by 18 worm gear reducers, each with 2 Timken® bearings on the worm wheel shaft. Timken bearings hold the wheel in accurate alignment to prevent excessive wear and friction between the gears.

The heavy thrust load on the worm wheel is handled without extra thrust bearings. Timken bearings, being *tapered,* take both radial and thrust loads, or any combination of the two.

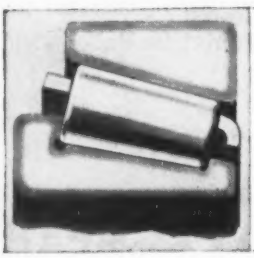
Timken bearings keep shafts and housings concentric, making closures more effective. This is particularly important in any food-processing equipment because leakage of lubricant from around the worm wheel shaft must be prevented.

Specify Timken tapered roller bearings on the machines you build or buy. Look for the trade-mark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



VULCAN COPPER & SUPPLY COMPANY mounts worm wheel shafts of their Counter-Current Solvent Extractor on Timken bearings to reduce gear wear.



HARD ON THE OUTSIDE, TOUGH ON THE INSIDE

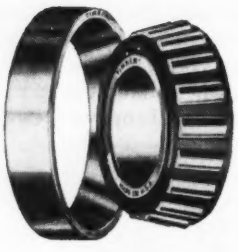
Rollers and races of Timken bearings are case-carburized to give a hard, wear-resisting surface and a tough, shock-resisting core. Result: longer bearing life.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis Timken steels.

TIMKEN

TRADE MARK REG. U.S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST ◫ LOADS OR ANY COMBINATION ◎

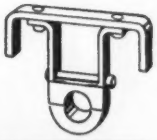
See why Link-Belt screw conveyors are 8 ways better

1. LOOK FOR UNIFORMITY OF PITCH

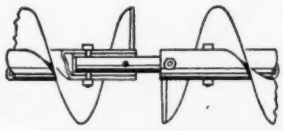
Specialized modern machinery assures accurate forming, producing uniform flighting curvature.

2. ONLY SPECIALLY SELECTED STEELS

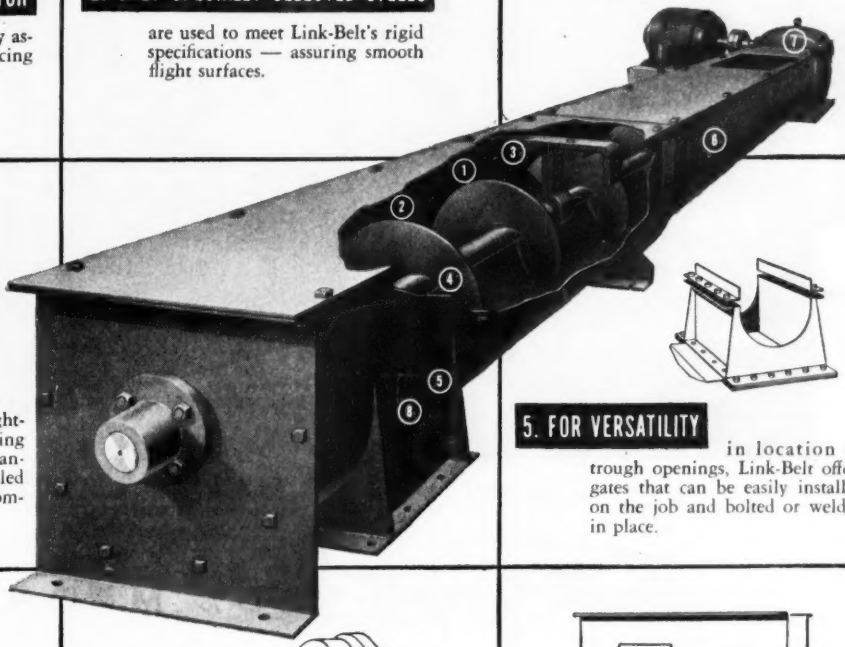
are used to meet Link-Belt's rigid specifications — assuring smooth flight surfaces.



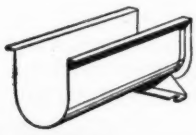
3. HERE'S A WIDE RANGE of hanger styles and mountings with various bearing materials.



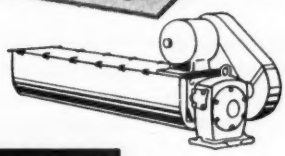
4. FOR YOUR PROTECTION straightness is checked before shipping and extra care is taken in handling and loading. Jig-drilled coupling bolt holes assure complete and easy assembly.



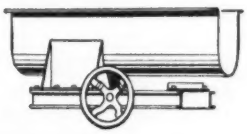
5. FOR VERSATILITY in location of trough openings, Link-Belt offers gates that can be easily installed on the job and bolted or welded in place.



6. YOU'LL DISCOVER that troughs are accurately fabricated to assure better fit of all components. Link-Belt offers a choice of metals to fit your particular application.



7. ONLY LINK-BELT builds a complete integrated line of gear and chain drives, couplings, bearings. One proved source . . . one undivided responsibility.



8. YOUR CHOICE of fixed or detachable plain discharge spouts or gates. Flat or curved slide type gates can be hand or rack-and-pinion operated.

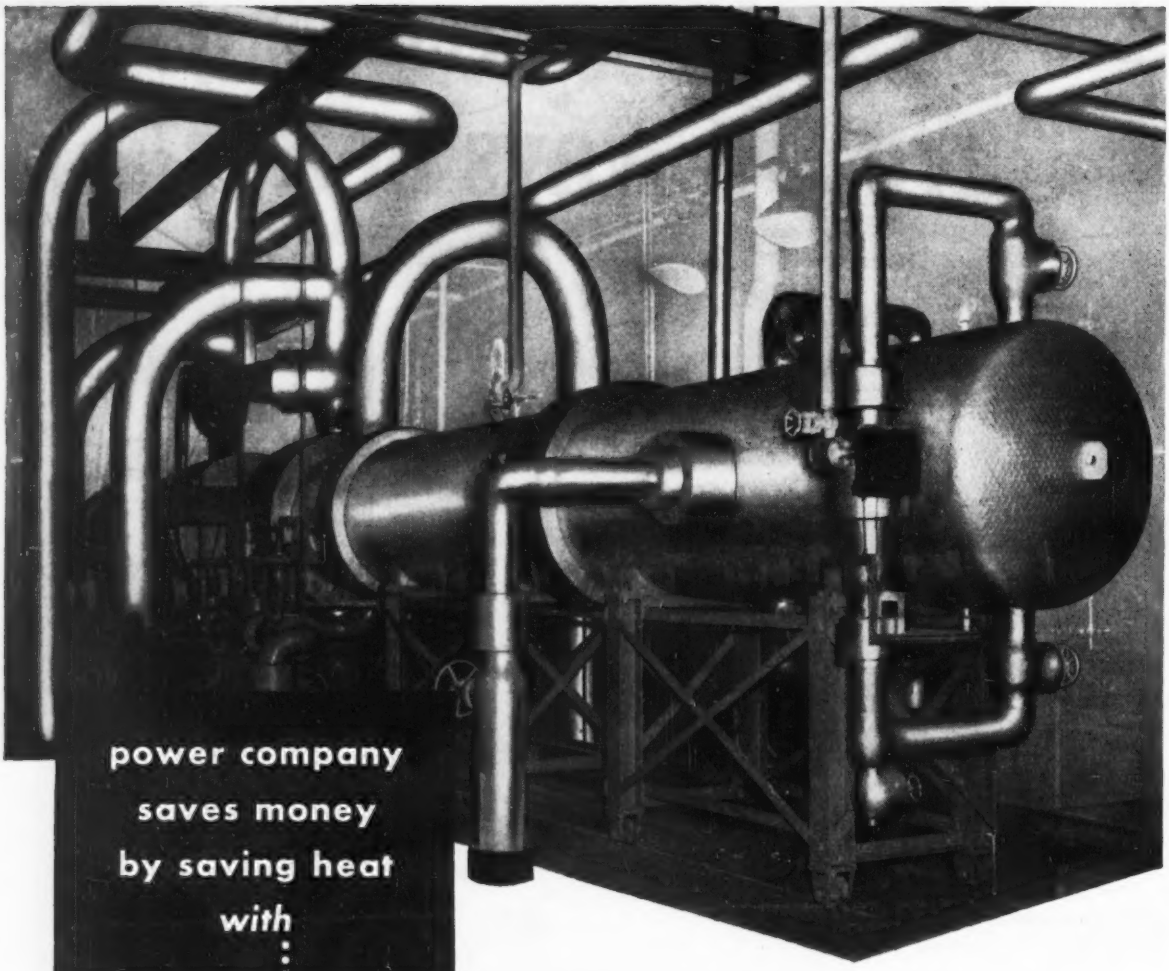
LINK-BELT

SCREW CONVEYORS

These are only a few of the many important differences in screw conveyors. Ask your Link-Belt sales representative or distributor for new 92-page Data Book 2289.

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle; Scarboro, Toronto and Elmira, Ont. (Canada); Springs (South Africa); Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities. 13,278

For more information, use coupon on page 179.



Steam heater insulated with "Featherweight" 85% Magnesia blocks and K&M asbestos cement. Meramec Power Plant, Union Electric Co., St. Louis, Mo. Insulation Contractor: Armstrong Cork Company

"Featherweight"® 85% MAGNESIA

In Union Electric Company's Meramec Power Plant, "Featherweight" 85% Magnesia was used to insulate the steam heater pictured above. Such an application is a typical one for dependable "Featherweight."

By itself this material (85% basic carbonate of Magnesia and asbestos fiber) is effective on piping and equipment with temperatures up to 600° F. Used with K&M Hy-Temp Insulation (diatomaceous silica), its range is extended to 1900° F.

Hy-Temp is applied directly to the hot surface, and "Featherweight" is used as the second layer. The two insulations are applied with staggered vertical and horizontal joints—thus eliminating heat loss which occurs on single layer installations when the expansion of hot piping and equipment causes the joints to open.

This K&M combination insulation will last the life of the equipment it serves, will withstand moisture, alternate heating and cooling, wetting and drying. Both materials are supplied in various sizes and thicknesses.

Your K&M distributor is an experienced applicator who will gladly give you more information about these heat-saving, money-saving K&M insulations. Or write directly to us.

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K&M best in asbestos®

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IT'S Alvamaple

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In many food plants ALVA imitation maple has been the standard for over thirty years as flavoring for candies, syrups, baked goods, extracts, ice cream, etc.

Wherever the best real North Woods flavor is wanted, try ALVA imitation maple. We think it will be your standard too, year after year.

Samples and recommendations for your particular product at your request.

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521 West 57th St., New York 19, N. Y.

Alva FLAVORS

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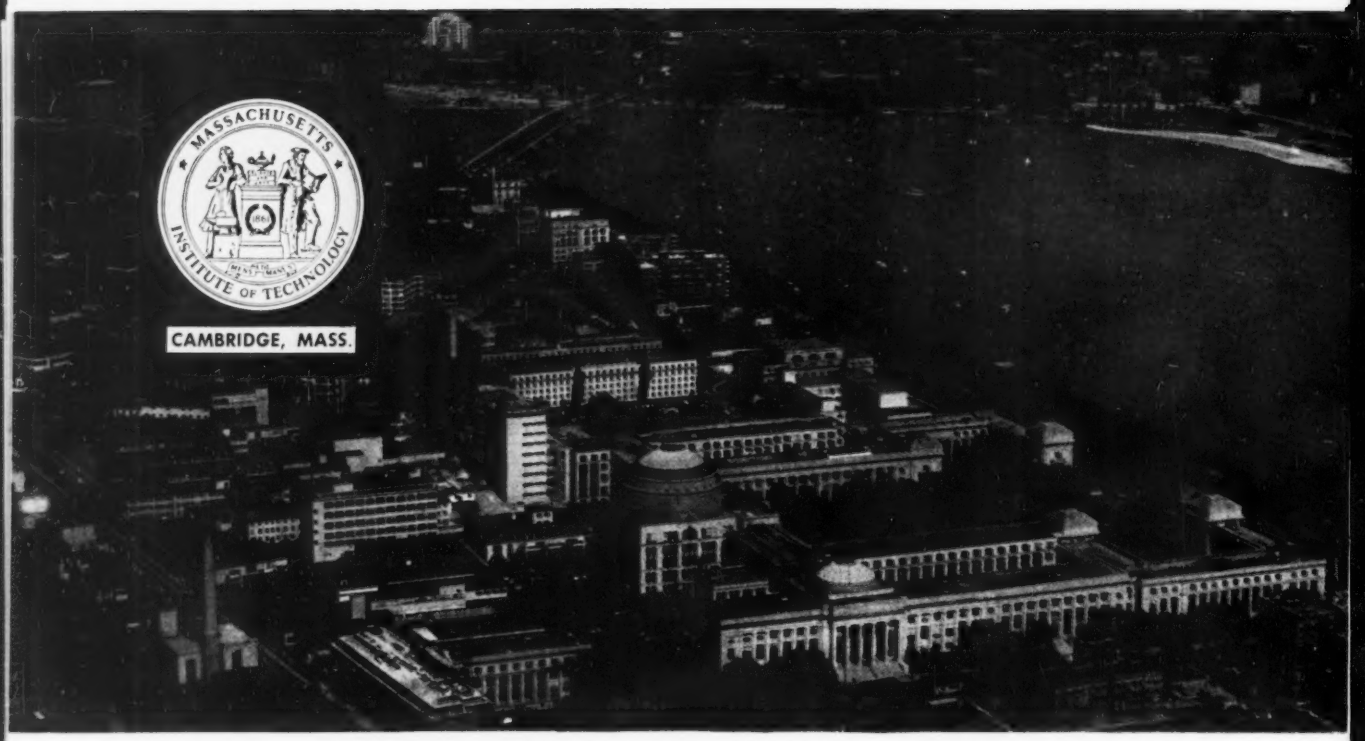
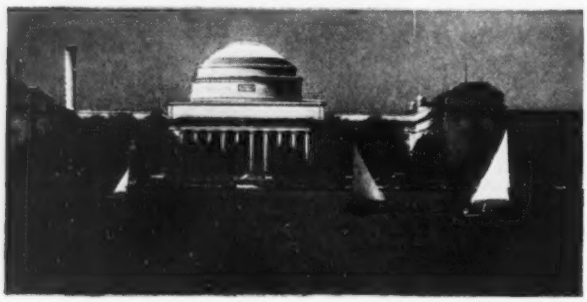


Another M. I. T. *Building Equipped*

In this Famous Scientific Institute Powers thermostatic control for heating and air conditioning systems is used in the new Dorrance Laboratory for Biology and Food Technology and in the buildings listed below.

- **MAIN EDUCATIONAL AND ADMINISTRATION BUILDINGS**
- **GAS TURBINE LABORATORY**
- **CHEMICAL ENGINEERING BUILDING**
  Architects: Coolidge and Carlson • Contractor: The Downey Co.
- **HAYDEN MEMORIAL LIBRARY**
  Architects and Engineers: Vorhees, Walker, Foley and Smith
  Contractor: Cleghorn Co.
- **NUCLEAR SCIENCE LABORATORY**
  Architects: Anderson & Beckwith • Contractor: The Merrill Co., Inc.
- **SWIMMING POOL BUILDING**
  Architects: Anderson & Beckwith
  Engineers: Wolff & Munier • Contractor: H. E. Whitten Co.
- **NEW AUDITORIUM, now under construction**
  Architects: Eero Saarinen & Associates
  Associate Architects: Anderson & Beckwith
  Engineer: Hyde & Bobbio • Contractor: H. E. Whitten Co.



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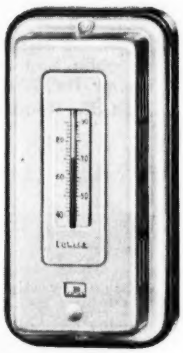

Powers Room Type Thermostat pneumatically regulates heating and air conditioning systems. Outstanding for accuracy and dependability.

Laboratory with an Exciting Future – From this modern laboratory with its excellent staff and research facilities will come great advances that will surpass the progress of the past and produce discoveries which will benefit us all.

Correct room temperature and humidity is important here. Research labs, animal rooms, constant temperature rooms and classrooms require the even, constant temperature assured by a Powers control system.

When you want dependable, accurate control for heating, cooling or air conditioning for any building or industrial process call Powers. With over 60 years of experience and efficient modern equipment we can help you select the best control for your requirements.

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OVER 60 YEARS OF AUTOMATIC TEMPERATURE CONTROL

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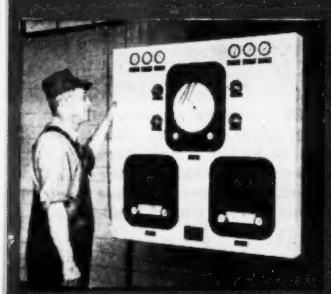
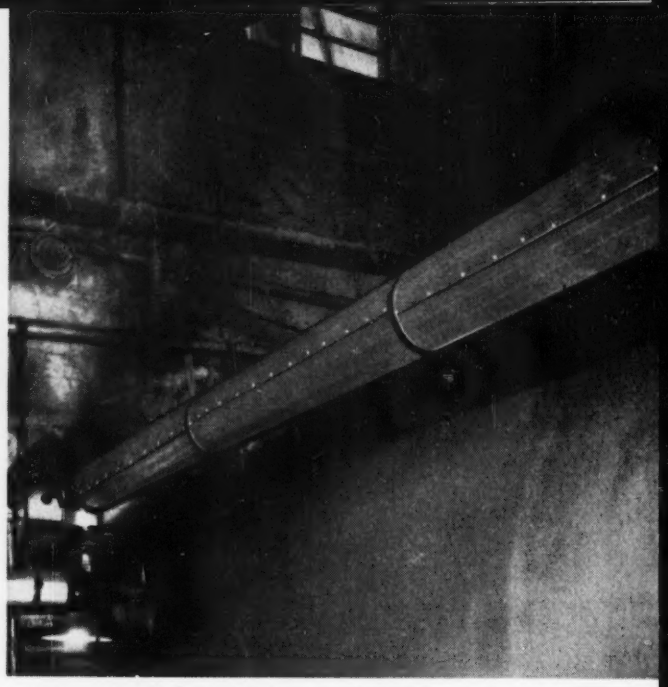


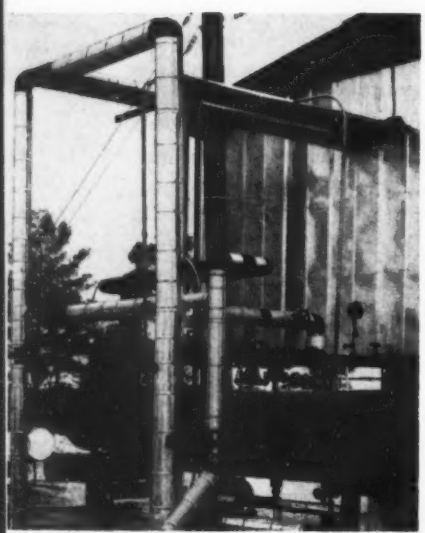
IN PETROLEUM REFINERIES like this a new kind of aluminum jacketing is used to protect the insulation on hot and cold lines. It is known as Childers Aluminum Jacketing and is especially engineered to combine the long life and weather resistance of aluminum with a low first cost. It goes on quick and easy—can be used and re-used. It is made of tough but flexible .006" 35 aluminum alloy, so it handles easily and requires no shop forming.



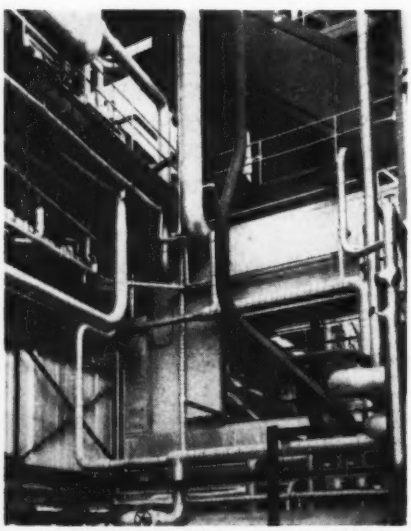
IN CHEMICAL AND PAPER plants: engineers are finding new uses for this easy-to-handle jacketing. Childers Jacketing here is in use at Scott Paper Company's tremendous Chester, Pa., plant. The insulated line passes between fast moving rolls carrying the felt used in paper making both above and below the line. The Aluminum Jacketing protects against paper dust and water, both of which are always present in the manufacture of paper. The jacketing also appreciably diminishes the possibility of the spread of fire which might strike across ordinary canvas jacketing.

Engineered for outdoor lines — new, low-cost aluminum jacketing now used in 567 processing plants

The new kind of aluminum jacketing for insulated lines shown in the pictures on this page is Childers Aluminum Weatherproof Jacketing. Write for samples and full details, no obligation. Childers Manufacturing Co., Dept. FE-5, 3620 W. 11th St., Houston 8, Texas.



IN FOOD PROCESSING plants such as this Minute Maid Corp. unit at Plymouth, Fla., Childers Jacketing is useful for both indoor and outdoor installations. Its clean, shining appearance and ease of washing are extra advantages.



IN POWER PLANTS—indoors and out—Childers Jacketing is an ideal material for protecting insulation. This is a big outdoor installation in the South. This jacketing needs no painting, and the gleaming aluminum surface makes for "good housekeeping" in any utility or institutional power station.

ALMOST ANYWHERE you have insulated lines in your processing plant, consider this specially engineered jacketing. It is flexible, easy-to-handle; yet it has the appearance values and the weather resistance that are inherent in aluminum. Write to address shown above for full details.

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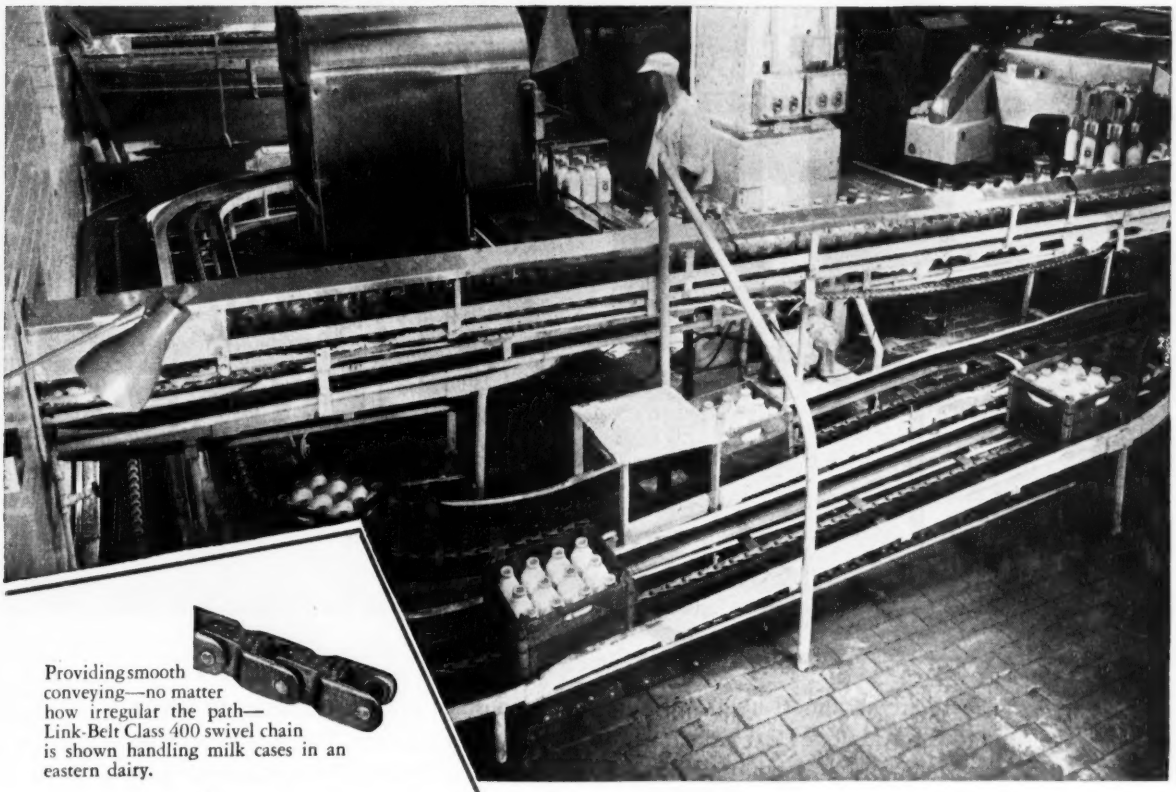
Around corners . . . over vertical curves--
Link-Belt swivel chain assures smooth travel

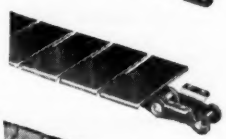


Providing smooth conveying—no matter how irregular the path—Link-Belt Class 400 swivel chain is shown handling milk cases in an eastern dairy.

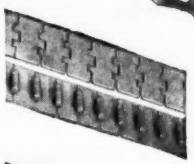
No ONE chain serves every purpose — choose the right one from the complete line

Class RC universal crescent flat-top chain can be used for multiplane operation traveling variety of paths.

Class RC flat-top chain —precision made for smoothest, spill-free carrying and long life.



S-815 flat-top conveyor chain — economical, sturdy, reliable, easy to detach and to keep clean.



Class RC crescent flat-top chain — travels in horizontal planes, around corners; ideal for bottles and cans.

LINK-BELT offers the chain that's best for every job

HERE'S an economical conveyor chain that's widely used for moving cases, cartons, cans, etc. In addition to its horizontal and vertical flexibility, this Link-Belt swivel chain can be assembled or uncoupled without the aid of tools.

Manufacturing refinements such as these are typical of every chain in the complete Link-Belt line. Accurate control of raw materials and manufacturing processes is your assurance of uniformity, longer life.

For complete information on chains and sprockets for conveying or drive service, see your Link-Belt sales representative. He can show you the *one* chain that's best suited to your exact requirements.

LINK-BELT

CHAINS and SPROCKETS 13,349

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

For High Efficiency, Low-Cost Heating, Cooling and Regeneration...

There are an almost unlimited number of industrial process problems to which the new De Laval Plate Heat Exchanger provides the ideal answer. This is true because its basic engineering design, type of construction and operational characteristics give it many inherent advantages over other equipment offered for heating and cooling applications. Some of them are:

1. **All heat-transmitting surfaces are readily accessible for inspection and cleaning.**
2. **Complies with sanitary requirements—designed for "in-place" cleaning.**
3. **Easy variation of assembly to meet changes in operation—plates are invertible (except Model P5).**
4. **Easy to assemble and disassemble—special design for precision tightening.**
5. **Space requirements are small.**
6. **Unsurpassed heat transmission.**
7. **All parts which contact the liquid are made of highest quality acid-resisting stainless steel.**
8. **Heater, cooler and regenerative sections may be assembled in one unit.**
9. **Several liquids can be heated or cooled simultaneously in different sections of the same Heat Exchanger.**
10. **Liquid cannot leak from one section to another and cannot become mixed with heating or cooling medium.**
11. **Sturdy construction for high-pressure operation.**
12. **Gaskets readily replaceable in user's plant.**
13. **Highest quality instrumentation by Taylor Instrument Company.**
14. **Wide range of sizes and capacities.**

We would welcome an opportunity to provide detailed information on the De Laval Plate Heat Exchanger as applied to your particular problem.

DE LAVAL

THE DE LAVAL SEPARATOR COMPANY
GENERAL OFFICES—Poughkeepsie, N.Y.
427 Randolph St., Chicago 6
DE LAVAL PACIFIC COMPANY
61 Beale St., San Francisco 5

For more information, use coupon on page 179.

your next
sales
success!

VITAMINS FOR BEVERAGES

● The soaring sales of low-calorie drinks prove America is health conscious. Good nutrition through an adequate vitamin supply can be another appeal to America's desire to stay healthy.

Vitamin B_1 and Vitamin C are already being used by leading bottlers. Some are now experimenting with the fortification of beverages with Vitamin B_{12}.

In more than 17 years as a leading vitamin manufacturer, Pfizer has accumulated extensive knowledge on fortifying foods and beverages. This information is at your disposal.

Make a vitamin-fortified soft drink your next sales success.

CHAS. PFIZER & CO., INC.

630 Flushing Ave., Brooklyn 6, N.Y.
Branch Offices: Chicago, Ill.; San Francisco, Calif.;
Vernon, Calif.; Atlanta, Ga.

Pioneers and Leading Manufacturers of Vitamins

Pfizer

For more information, use coupon on page 179.

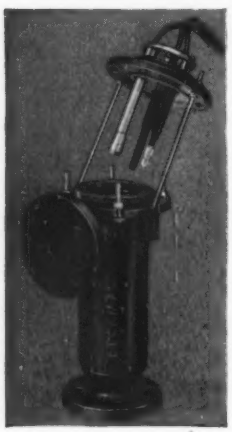
pH in food processing

Making better food products at lower cost . . .

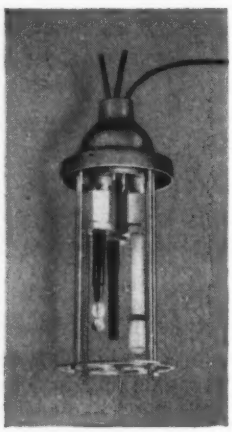
ACIDITY and alkalinity are more than a matter of taste in food products. They are chemical characteristics that influence many food qualities and processing operations. Through the application of modern instrumentation, these characteristics can be readily measured and often controlled automatically.

What is pH?

Chemists have devised the pH scale as a means of expressing the acidity or alkalinity of a solution. The scale extends, for all practical purposes, from 0 to 14. The numbers are a way to measure the concentration of hydrogen ions in a solution. Pure water has a pH of 7. Below 7, solutions are acid; the more acid, the lower the pH number. Conversely, alkaline solutions have a pH value above 7, and keep getting higher as they become more strongly alkaline. The scale is logarithmic; a change of 1 pH means a ten-fold change in the hydrogen ion concentration.



Flow type electrode assembly.



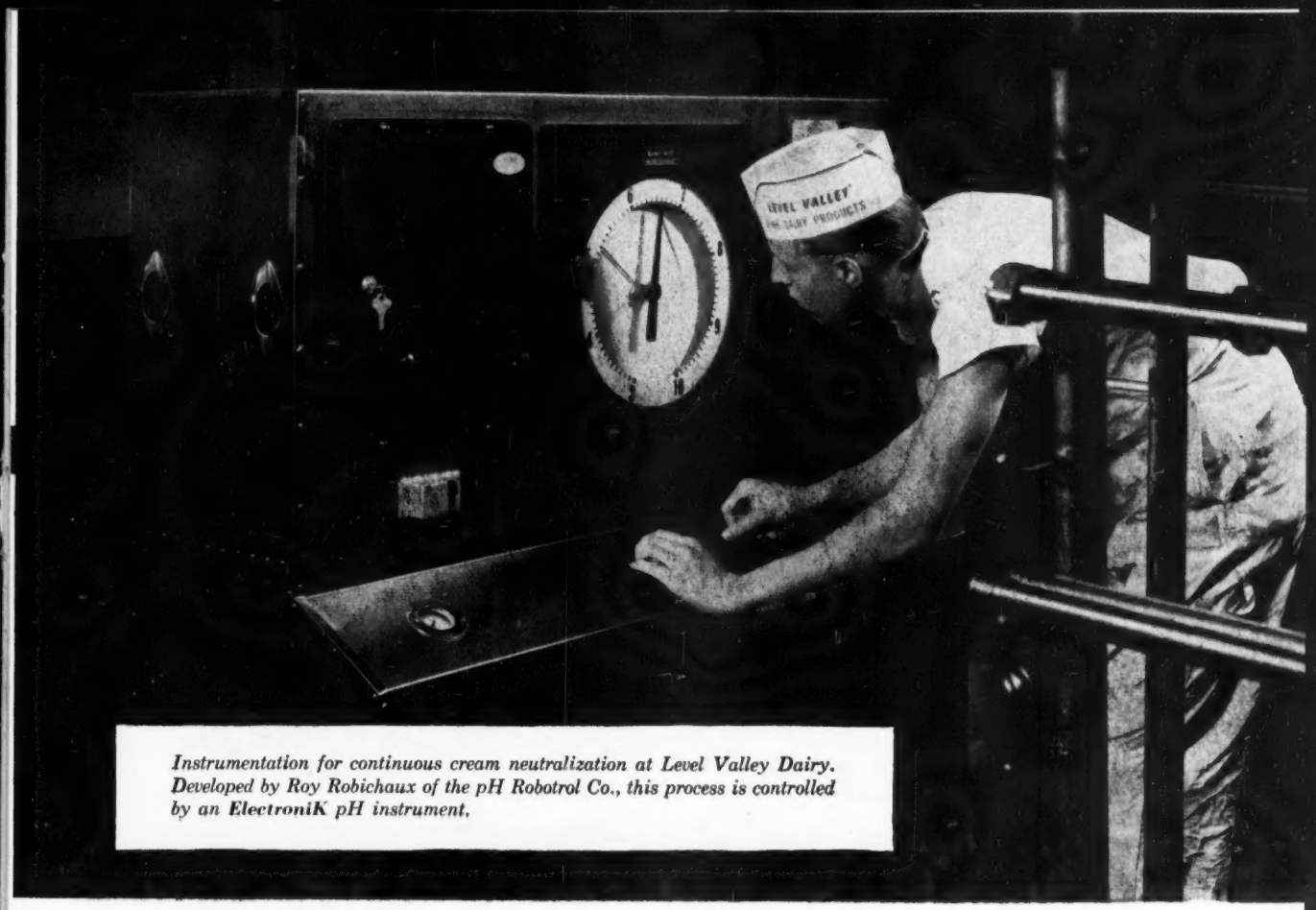
Immersion type electrode assembly.

How is it measured?

Formerly requiring elaborate laboratory equipment, pH measurements are made today in many industries by means of the glass electrode system. This consists of a pair of elements, one of which has a special glass bulb at its tip, continuously immersed in the solution to be tested. The electrical millivoltage which this system develops is measured by an electrometer and is recorded directly in pH units by an *ElectroniK* potentiometer.

How about control?

The *ElectroniK* pH instrument can often regulate the flow of a corrective reagent to hold pH at a set value . . . thus eliminating the uncertainties of manual operation. For instance, if a product is slightly acid and it is desirable to make it neutral, the instrument actuates a valve to adjust the addition of an alkaline solution. pH control requires engineering by a Honeywell specialist, who takes into consideration such factors as reaction time, buffering action and process lags. When properly designed, pH control can make valuable contributions to product quality, uniformity and economy in many food processes.



Instrumentation for continuous cream neutralization at Level Valley Dairy. Developed by Roy Robichaux of the pH Robotrol Co., this process is controlled by an ElectroniK pH instrument.

. . . through automatic pH control

THE WAY that modern instrumentation can help convert a hit-or-miss batch process into a closely regulated, continuous operation is well exemplified by the continuous cream neutralization system at the Level Valley Dairy, West Bend, Wis. Under the control of an *ElectroniK* pH instrument, this process automatically adjusts the acidity of cream going through a continuous pasteurizer. Here, as in other dairies where the *pH Robotrol* process is operating, several outstanding benefits are being realized.

Improved flavor—no oxidized taste, no "tallowiness" from overneutralization.

Longer storage life—butter stays fresh longer; doesn't get "fishy" due to over-acidity.

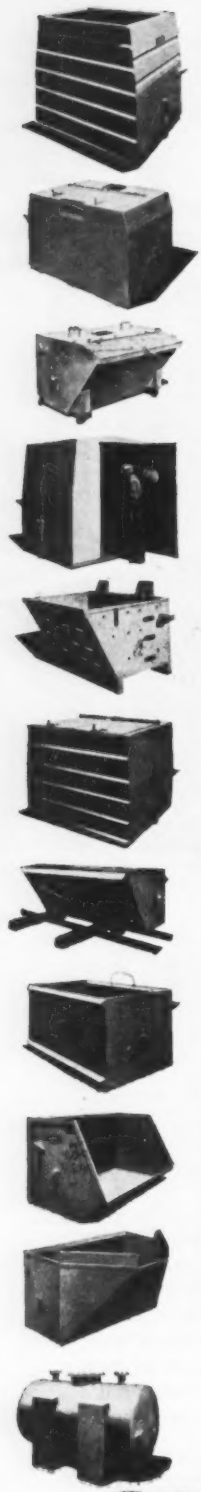
Faster production—continuous, fully automatic process eliminates delays of batch operation; ends need for accumulating cream receipts before processing. Many plants can double daily production!

Honeywell instrumentation offers food processors unlimited opportunity to improve efficiency and product quality. At your service is a thorough line of measuring and controlling instruments encompassing practically every food process—plus an extensive background of engineering experience in the control problems of the industry. Your nearby Honeywell sales engineer will be glad to discuss your own plant's applications . . . and he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Aves., Philadelphia 44, Pa.

● **REFERENCE DATA: Write for Catalog No. 1550 and Instrumentation Data Sheet No. 3.4-9.**

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls



You will Dump High Costs, too..

. . . when you install the Dempster-Dumpster System of Bulk Materials Handling

Manufacturers over the nation have learned to eliminate the costly and inefficient method of handling bulk materials with conventional dump trucks, drivers and loading crews. You can equip one truck with a hydraulically operated Dempster-Dumpster. Then, inside or outside buildings at convenient accumulation points, you simply place detachable Dempster-Dumpster Containers, in capacities up to 4 times that of conventional dump truck bodies, with each designed to suit the materials to be handled—be they solids, liquids or dust . . . hot or cold . . . bulky, light or heavy. Containers shown at left, all handled by one Dempster-Dumpster, are only a few of the many available or that can be built to meet your needs. The Dempster-Dumpster, operated by only one man, the driver, serves scores of containers . . . one after another, as shown below.

You eliminate trucks standing idle. You eliminate re-handling of materials. You eliminate loading crews. You increase efficiency, sanitation and good plantkeeping with this Dempster-Dumpster System—the lowest cost method of bulk materials handling ever devised. Write to us for complete information. Manufactured exclusively by Dempster Brothers, Inc.

THE DEMPSTER DUMPSTER SYSTEM

DEMPSTER BROTHERS, 734 Shea Building, Knoxville 17, Tennessee

Improve quality control in all types of processing with

Votator®

CONTINUOUS PROCESSING APPARATUS

COOLING

CHILLING

MIXING

SLUSH FREEZING

PASTEURIZING

STERILIZING

CRYSTALLIZING

PLASTICIZING

ENZYME INACTIVATION

COOKING

AERATING

WHIPPING

Starch jellies now cooked continuously with exact moisture control

This is the first commercial installation for continuous cooking of starch jellies—made possible by the perfect quality control permitted by VOTATOR* Heat-transfer Apparatus. In place of the old open kettle method, where excess water was evaporated by boiling, and drying required several days, the starch jelly is now cooked in seconds with exactly the right amount of moisture required for the finished jelly. Cuts fuel costs $45 per day. The finished product now has greater clarity, is free from caramelization, and does not have the usual hard skin. Formulations for any degree of firmness can be produced.

Whatever your processing operations, it will pay you to investigate the advantages of VOTATOR Continuous Processing Apparatus. It gives you perfect control over your processing, and reduces labor and handling costs to a minimum.

* VOTATOR—Trade Mark Reg. U. S. Pat. Off.

Mail Coupon for information

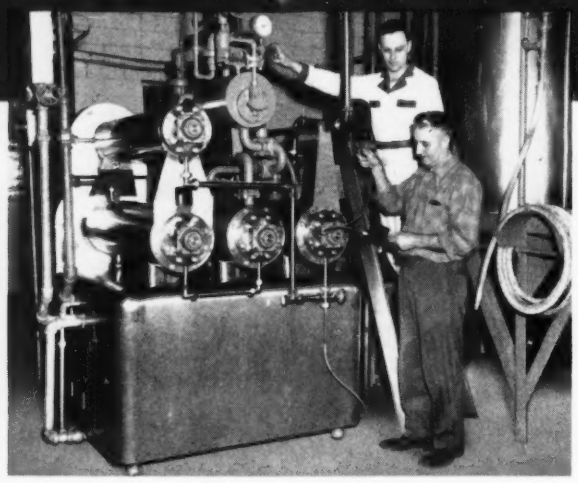
The **GIRDLER** Company

A DIVISION OF NATIONAL CYLINDER GAS COMPANY

VOTATOR DIVISION

Get the complete job from GIRDLER

Girdler chemists and engineers have developed distinctive processes and apparatus for many applications—cooking, cooling, plasticizing, hydrogenating, deodorizing, etc. For evaluation of new processes, Girdler offers cost-plus contracts covering preliminary engineering.



A complete plant for processing salad dressing designed and installed by Girdler. An important part of Girdler's complete service is furnishing field engineers to start up and inspect new installations, and train your operating personnel.

THESE PRODUCTS CAN BE PRODUCED BETTER WITH VOTATOR* CONTINUOUS PROCESSING APPARATUS

- Marshmallow
- Cake Batter
- Cream Style Corn
- Dog Food
- Chocolate Milk Drink
- Edible Starch (For Salad Dressing)
- Pie Filling
- Soup
- Lard
- Margarine
- Shortening
- Sweetened Condensed Milk
- Invert Syrup
- Eggs
- Concentrates, Fruit Juices and Purees
- Juice Concentrates
- Starch Gum Jellies
- Strained Foods

* VOTATOR Trade Mark Reg. U. S. Pat. Off.

WHEN PLANNING modernization or new construction of continuous processing facilities, you'll save time and assure sound results by having Girdler assume undivided responsibility. Girdler offers complete process design, engineering and construction service.

Girdler's Votator Division has designed and built an impressive number of complete plants for food processing. Our research and development department is well equipped to help you in applying continuous processing to your production.

Write for booklet V-39 which gives complete information on the application of VOTATOR* Heat-transfer Apparatus. It contains a 12-page technical section with valuable reference data and charts. Send coupon for free copy.

THE GIRDLER COMPANY
224 East Broadway, Louisville 1, Kentucky

Send booklet V-39 describing Continuous Processing.

Name .....

Position .....

Company .....

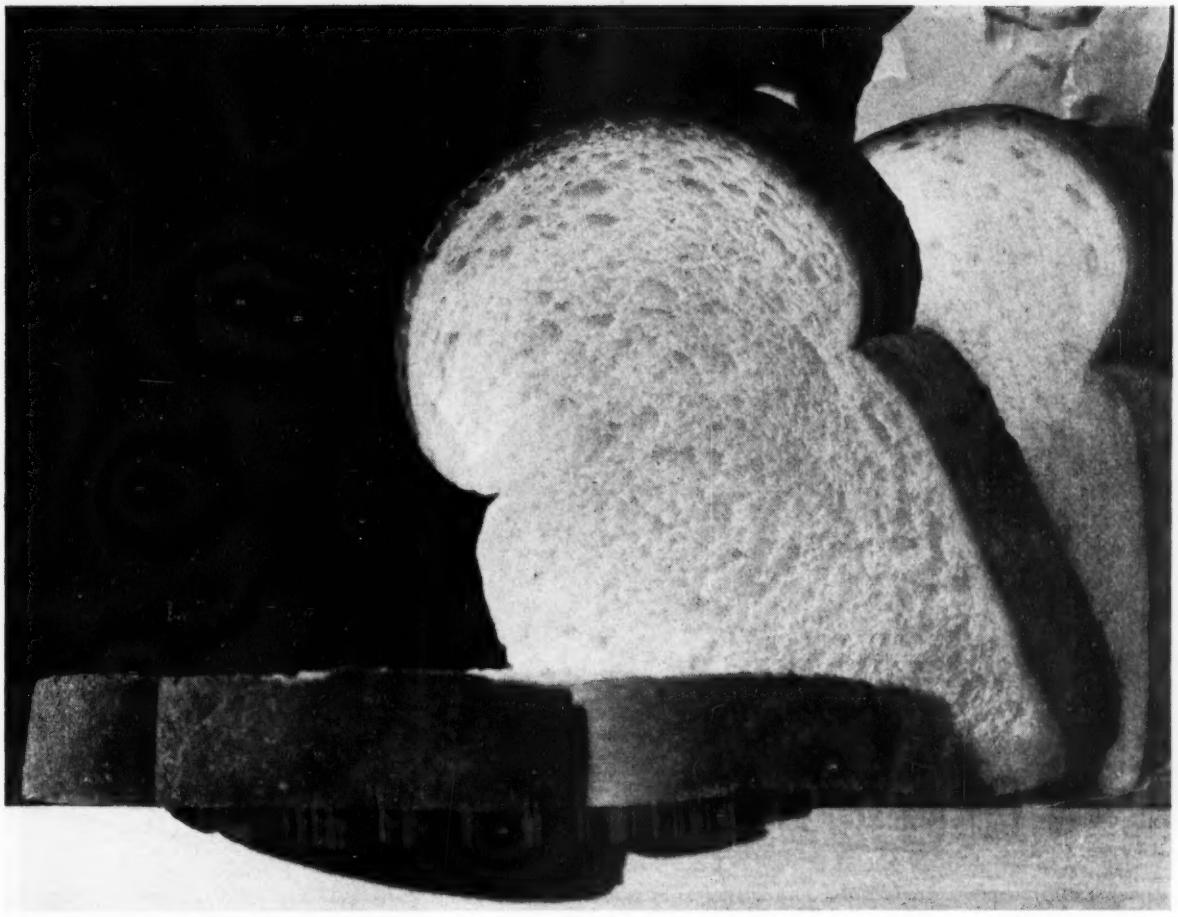
Address .....

City ..... *State* .....

The **GIRDLER** Company

A DIVISION OF NATIONAL CYLINDER GAS COMPANY
LOUISVILLE 1, KENTUCKY

VOTATOR DIVISION: New York, Atlanta, Chicago, San Francisco



Why flavor and aroma are safe with **Myvatex Food Emulsifier**

It's all in the way we make it.

The active ingredient in Myvatex Food Emulsifier is concentrated monoglyceride derived entirely from prime steam lard and chemically pure, food-grade glycerine. The purification and concentration of this ingredient by molecular distillation starts where the manufacture of other monoglyceride mixtures leaves off. Then we homogenize under nitrogen the distilled monoglyceride with an equal amount of lard. The result is a bland fat that has no undesirable effect on the flavor or aroma of the finished bread.

Myvatex Food Emulsifier has a wonderful effect on the tenderness, volume, grain, and crumb structure of bread. It's easy to use, too. Myvatex can be added to the sponge mix or the dough. Being a plastic fat, there's no melting before use, no necessity of making a water dispersion to assure complete incorporation in the mixer.

You can find out for yourself how Myvatex can improve the economy of your operation and the quality of your bread by trying a sample in your own shop. Let us know how much you need for a fair test. Write ***Distillation Products Industries,*** Rochester 3, N. Y. Sales offices: New York and Chicago • W. M. Gillies and Company, Los Angeles and San Francisco • Charles Albert Smith Limited, Montreal and Toronto.

"Myvatex" is a trade-mark.

distillers of monoglycerides made from natural fats and oils

DPi

Also . . . vitamins A and E

Distillation Products Industries *is a division of* **Eastman Kodak Company**

For more information, use coupon on page 179.

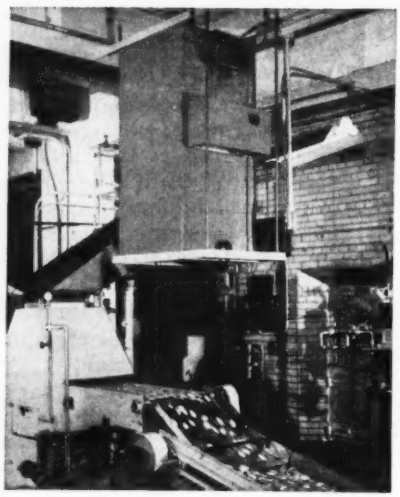
A TASTY BUT DISTRESSING PROBLEM

Felber Biscuit Company in the process of spraying hot cocoanut oil on their delicious Town House crackers, acquired an unwelcome oil mist problem. A fan exhaust system—installed to clear the air—wasted gallons of costly cocoanut oil and created a dangerous fire threat.

How to flavor these famous crackers without oil-painting the entire building? Felber Biscuit did it with an Oil Mist PRECIPITRON!

Excess oil mist is now drawn into a Westinghouse PRECIPITRON and out of the air completely. Result: mist, mess and fire hazard have disappeared. Valuable cocoanut oil is now salvaged for re-use. Employee working conditions are greatly improved.

Perhaps Westinghouse PRECIPITRON can draw savings out of the air for *you*. There is a PRECIPITRON for every application for removing contaminants from the air. For an answer to *your* specific air cleaning problem . . . call your nearest Westinghouse-Sturtevant office today. Or write to Sturtevant Division, Westinghouse Electric Corporation, Hyde Park, Boston 36, Mass.



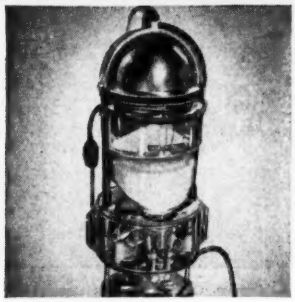
Westinghouse PRECIPITRON suspended directly over the hot cocoanut oil spray collects excess oil mist from the spraying operation. Clean air is returned to the room; valuable oil is reclaimed.

WESTINGHOUSE AIR HANDLING

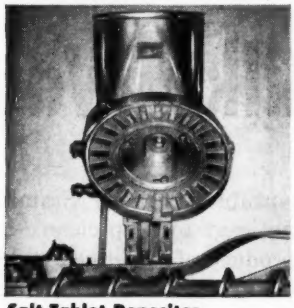
YOU CAN BE SURE... IF IT'S **Westinghouse** J-80332

MORTON

for all your canning salt needs



Bulk Salter
For precision salting by the economical bulk method. Designed for either plant-blended mixtures or quick-dissolving Morton Salt. Buying salt in bags and dispensing accurately metered amounts into each can saves real money.



Salt Tablet Depositor
Deposits *one* tablet in *each* can at high speeds with never-fail accuracy. The tablet depositor enables the canner to get the *exact* amount of salt, or other made-to-order mixtures, into each and every can.

Saturated high purity brine piped anywhere in your plant!

The Morton Brinemaker delivers up to 800 gals. of clear, fully saturated brine an hour, using the type of salt that is most economical or best suited for each plant. Saves labor and time—the brine can be pumped under pressure from ground floor to upper levels, or anywhere in your plant!

Morton has a salt to meet the requirements of *your* particular operation, now available from 9 strategically located plants. These specialized canning salts include *Morton 999*, a high purity salt; *Morton H. G. Granulated*, a screened high grade evaporated salt of controlled purity, quality and uniformity; *Morton K. D. Granulated*, a superior quality of evaporated salt; and *Morton Rock Salt*. A Morton Consulting Engineer will be glad to recommend the salt best suited for your needs.

UP TO 800 GALLONS OF BRINE AN HOUR

—available when you want it!

MORTON SALT COMPANY
Industrial Division
Dept. EB-3, 120 S. LaSalle St.
Chicago 3, Illinois

Please send me full details on the Morton Brinemaker. I would also like information on:

☐ Morton Canning Salt ☐ The Bulk Salter ☐ The Salt Tablet Depositor

Name and Title_____

Firm_____

Address_____

City_____ Zone_____ State_____

(Brinemaker not available on West Coast)

For more information, use coupon on page 179.

Allegheny Stainless from Ryerson

Helps Make Your Milky Way

First rule at the vast Mars candy kitchens in Chicago is *cleanliness*. That's why gleaming, corrosion-resistant stainless steel is used abundantly in the making and handling of famous Mars confections. And prompt, personal service on Allegheny Stainless is provided by the nearby Ryerson Plant.

You'll find Ryerson a convenient source for stainless too, because Ryerson stainless stocks are the largest in the nation. Ten types of stainless sheets are on hand. Pipe and tubing —more than 260 miles of it. Also stainless fittings and fastenings, bars, plates, etc. And our stainless specialists are always ready to work with you on problems of application or fabrication.

You'll find beautiful Allegheny Stainless Steel easy to clean, easy to keep clean. It's the time-tested product of America's oldest stainless producer. So, call Ryerson—pioneer warehouse distributor of stainless—for all your requirements and count on us for fast service.

PRINCIPAL PRODUCTS

CARBON STEEL BARS—Hot rolled and cold finished
STRUCTURALS—Channels, angles, beams, etc.
PLATES—Many types including Inland 4-Way Safety Plate
SHEETS—Hot and cold rolled, many types and coatings
TUBING—Seamless and welded, mechanical and boiler tubes
ALLOYS—Hot rolled, cold finished, heat treated. Also tool steel
STAINLESS—Allegheny bars, plates, sheets, tubes, etc.
BABBITT—Five types, also Ryertex plastic bearings
MACHINERY & TOOLS — For metal fabrication

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JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND • DETROIT
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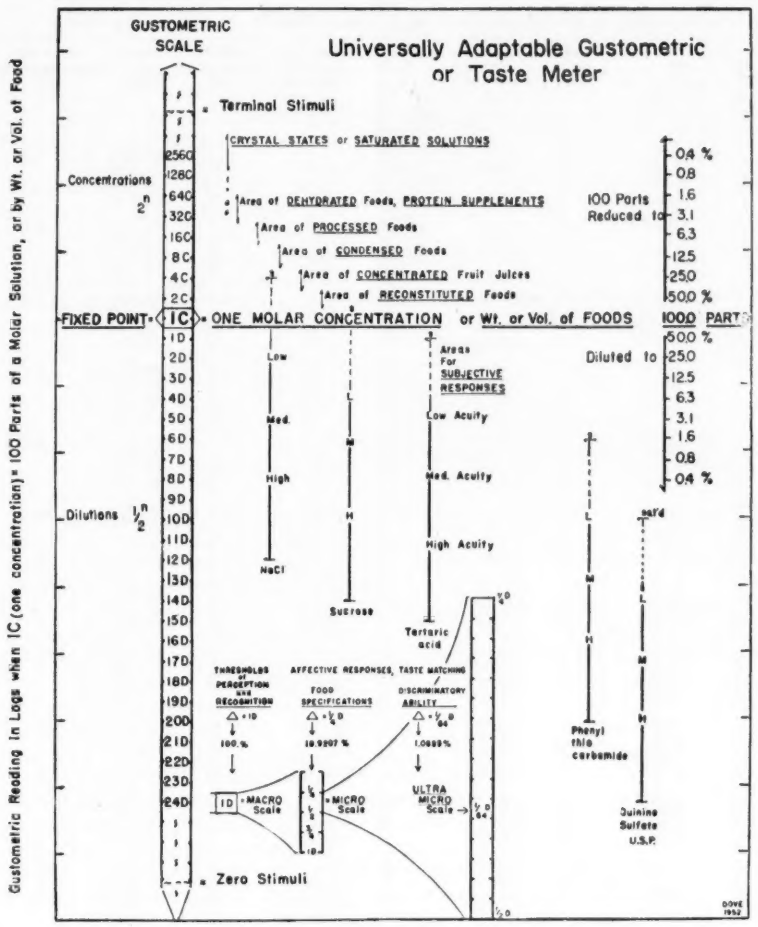


Concept and . . .

. . . Application

"TASTE THERMOMETER"

Brings Food Quality Into Focus

Universal scale offers instrument precision in gaging taste response. Seen as vital "slide rule" in solving problems in formulation, processing, nutrition, acceptability

LLOYD E. SLATER
Associate Editor, "Food Engineering".
(With photos courtesy Illustration Studios, University of Illinois, Chicago)

All food tastes can be scaled with the basic system now being pioneered by Dr. W. Franklin Dove, University of Illinois nutritionist.

Like a mercury thermometer, Dr. Dove's taste scaling operates on a fixed point of origin and progression of values—hence it will undoubtedly be called the "Taste Thermometer" by its users. However, its inventor employs the more accurate title of Gustometric Scale.

Basically, the scale is predicated on the fact that taste is, in reality, the result of competition and interaction between a product's various acids, sugars, salts, etc. So scale intervals are actually founded on dilution units of these dominant chemical components.

Unlike previous efforts, then, the gustometric scale is not based alone on stimulus, response, or physical quantities, but is rather a mathematically developed series of numbers equivalent to the taste changes that occur when foods are diluted or concentrated.

These specific scale values—called D-units—thus permit rapid comparison and duplication of the same unit

Turn Page for Table Covering Tastes and Foods ⟶

Gustometric Units Logged Out

Sodium Chloride NaCl M.W. = 58.454 IAW[4]		Sucrose $C_{12}H_{22}O_{11}$ M.W. = 342.296 IAW		Tartaric Acid $C_4H_6O_6$ M.W. = 150.088 IAW		Phenylthiocarbamide $C_6H_5{\cdot}NH{\cdot}CS{\cdot}NH_2$ M.W. = 152.216 IAW		Quinine Sulfate, U.S.P. $(C_{20}H_{24}N_2O_2)_2{\cdot}H_2SO_4{\cdot}2H_2O$ M.W. = 782.93 IAW		Foods and Beverages Natural or Processed Parts to the Whole		
Dilution Units (log)	Grams in liter of solution	Dilution Units (log)	Grams in liter of solution	Dilution Units (log)	Grams in liter of solution	Dilution Units (log)	Grams in liter of solution	Dilution Units (log)	Grams in liter of solution	Scale for Dilutions ¼[a]	Volume or Weight	Scale for Concentrations 2[a]
¼	393.2301	¼	575.6710	¼	126.2085	¼	4.0000	¼	1.2859			
½	330.6658	½	484.0796	½	106.1282	½	3.3635	½	1.0813			
¾	278.0557	¾	407.0608	¾	89.2429	¾	2.8284	¾	0.9092			
4 C =	*233.8160*	*1 C* =	*342.2960*	*1 D* =	*75.0440*	*6 D* =	*2.3784*	*10 D* =	*0.7646*	*1 C* =	*1,000.0000* =	*1 C*
¼	196.6150	¼	287.8355	¼	63.1042	¼	2.0000	¼	0.6429	¼	840.8964	
½	165.3329	½	242.0398	½	53.0641	½	1.6818	½	0.5406	½	707.1068	
¾	139.0278	¾	203.5304	¾	44.6214	¾	1.4142	¾	0.4546	¾	594.6036	
2 C =	*116.9080*	*1 D* =	*171.1480*	*2 D* =	*37.5220*	*7 D* =	*1.1892*	*11 D* =	*0.3823*	*1 D* =	*500.0000* =	*2 C*
¼	98.3075	¼	143.9177	¼	31.5521	¼	1.0000	¼	0.3215	¼	420.4482	
½	82.6664	½	121.0199	½	26.5320	½	0.8409	½	0.2703	½	353.5534	
¾	69.5139	¾	101.7652	¾	22.3107	¾	0.7071	¾	0.2273	¾	297.3018	
1 C =	*58.4540*	*2 D* =	*85.5740*	*3 D* =	*18.7610*	*8 D* =	*0.5946*	*12 D* =	*0.1911*	*2 D* =	*250.0000* =	*4 C*
¼	49.1538	¼	71.9589	¼	15.7761	¼	0.5000	¼	0.1607	¼	210.2241	
½	41.3332	½	60.5100	½	13.2660	½	0.4204	½	0.1352	½	176.7767	
¾	34.7570	¾	50.8826	¾	11.1554	¾	0.3535	¾	0.1137	¾	148.6509	
1 D =	*29.2270*	*3 D* =	*42.7870*	*4 D* =	*9.3805*	*9 D* =	*0.2973*	*13 D* =	*0.0956*	*3 D* =	*125.0000* =	*8 C*
¼	24.5769	¼	35.9794	¼	7.8880	¼	0.2500	¼	0.0804	¼	105.1121	
½	20.6661	½	30.2550	½	6.6330	½	0.2102	½	0.0676	½	88.3883	
¾	17.3785	¾	25.4413	¾	5.5777	¾	0.1768	¾	0.0568	¾	74.3254	
2 D =	*14.6135*	*4 D* =	*21.3935*	*5 D* =	*4.6903*	*10 D* =	*0.1486*	*14 D* =	*0.0478*	*4 D* =	*62.5000* =	*16 C*
¼	12.2884	¼	17.9898	¼	3.9440	¼	0.1250	¼	0.0402	¼	52.5560	
½	10.3333	½	15.1275	½	3.3165	½	0.1051	½	0.0338	½	44.1942	
¾	8.6892	¾	12.7207	¾	2.7888	¾	0.0884	¾	00.284	¾	37.1627	
3 D =	*7.3067*	*5 D* =	*10.6968*	*6 D* =	*2.3451*	*11 D* =	*0.0743*	*15 D* =	*0.0239*	*5 D* =	*31.2500* =	*32 C*
¼	6.1442	¼	8.9949	¼	1.9720	¼	0.0625	¼	0.0201	¼	26.2780	
½	5.1667	½	7.5637	½	1.6583	½	0.0526	½	0.0169	½	22.0971	
¾	4.3446	¾	6.3603	¾	1.3944	¾	0.0442	¾	0.0142	¾	18.5814	
4 D =	*3.6534*	*6 D* =	*5.3484*	*7 D* =	*1.1726*	*12 D* =	*0.0372*	*16 D* =	*0.0119*	*6 D* =	*15.6250* =	*64 C*
¼	3.0721	¼	4.4974	¼	0.9860	¼	0.0312	¼	0.0100	¼	13.1390	
½	2.5833	½	3.7819	½	0.8291	½	0.0263	½	0.00845	½	11.0485	
¾	2.1723	¾	3.1802	¾	0.6972	¾	0.0221	¾	0.00710	¾	9.2907	
5 D =	*1.8267*	*7 D* =	*2.6742*	*8 D* =	*0.5863*	*13 D* =	*0.0186*	*17 D* =	*0.00597*	*7 D* =	*7.8125* =	*128 C*
¼	1.5361	¼	2.2487	¼	0.4930	¼	0.0156	¼	0.00502	¼	6.5695	
½	1.2917	½	1.8909	½	0.4146	½	0.0131	½	0.00422	½	5.5243	
¾	1.0862	¾	1.5901	¾	0.3486	¾	0.0110	¾	0.00355	¾	4.6453	
6 D =	*0.9133*	*8 D* =	*1.3371*	*9 D* =	*0.2931*	*14 D* =	*0.00929*	*18 D* =	*0.00299*	*8 D* =	*3.9063* =	*256 C*
¼	0.7680	¼	1.1244	¼	0.2465	¼	0.00781	¼	0.00251	¼	3.2848	
½	0.6458	½	0.9455	½	0.2073	½	0.00657	½	0.00211	½	2.7621	
¾	0.5431	¾	0.7950	¾	0.1743	¾	0.00552	¾	0.00178	¾	2.3227	
7 D =	*0.4567*	*9 D* =	*0.6686*	*10 D* =	*0.1466*	*15 D* =	0.00465	*19 D* =	0.00149	*9 D* =	*1.9531* =	*512 C*
¼	0.3840	¼	0.5622	¼	0.1233	¼	0.00391	¼	0.00126	¼	1.6424	
½	0.3229	½	0.4727	½	0.1036	½	0.00328	½	0.00106	½	1.3811	
¾	0.2715	¾	0.3975	¾	0.0872	¾	0.00276	¾	0.000888	¾	1.1613	
8 D =	*0.2283*	*10 D* =	*0.3343*	*11 D* =	*0.0733*	*16 D* =	*0.00232*	*20 D* =	*0.000747*	*10 D* =	*0.9766* =	*1024 C*
¼	0.1920	¼	0.2811	¼	0.0616	¼	0.00195	¼	0.000628	¼	0.8212	
½	0.1615	½	0.2364	½	0.0518	½	0.00164	½	0.000528	½	0.6905	
¾	0.1358	¾	0.1988	¾	0.0436	¾	0.001381	¾	0.000444	¾	0.5807	
9 D =	*0.1142*	*11 D* =	*0.1671*	*12 D* =	*0.0366*	*17 D* =	*0.001161*	*21 D* =	*0.000373*	*11 D* =	*0.4883* =	*2048 C*
¼	0.0960	¼	0.1405	¼	0.0308	¼	0.000977	¼	0.000314	¼	0.4106	
½	0.0807	½	0.1182	½	0.0259	½	0.000821	½	0.000264	½	0.3453	
¾	0.0679	¾	0.0994	¾	0.0218	¾	0.000691	¾	0.000222	¾	0.2903	
10 D =	*0.0571*	*12 D* =	*0.0836*	*13 D* =	*0.0183*	*18 D* =	*0.000581*	*22 D* =	*0.000187*	*12 D* =	*0.2441* =	*4096 C*
¼	0.0480	¼	0.0703	¼	0.0154	¼	0.000483	¼	0.000157	¼	0.2053	
½	0.0404	½	0.0591	½	0.0130	½	0.000411	½	0.000132	½	0.1726	
¾	0.0339	¾	0.0497	¾	0.0109	¾	0.000345	¾	0.000111	¾	0.1452	
11 D =	*0.0286*	*13 D* =	*0.0418*	*14 D* =	*0.00916*	*19 D* =	*0.000290*	*23 D* =	*0.0000933*	*13 D* =	*0.1221* =	*8192 C*
¼	0.0240	¼	0.0351	¼	0.00770	¼	0.000244	¼	0.0000785	¼	0.1026	
½	0.0202	½	0.0295	½	0.00648	½	0.000205	½	0.0000660	½	0.0863	
¾	0.0170	¾	0.0248	¾	0.00545	¾	0.000173	¾	0.0000555	¾	0.0726	
12 D =	*0.0143*	*14 D* =	*0.0209*	*15 D* =	*0.00458*	*20 D* =	*0.000145*	*24 D* =	*0.0000467*	*14 D* =	*0.0610* =	*16384 C*
¼	0.0120	¼	0.0176	¼	0.00385	¼	0.000122	¼	0.0000392	¼	0.0513	
½	0.0101	½	0.0148	½	0.00324	½	0.000103	½	0.0000330	½	0.0432	
¾	0.0085	¾	0.0124	¾	0.00272	¾	0.000086	¾	0.0000277	¾	0.0363	

[4] Periodic data are based upon International Atomic Weights, September, 1951 (*92*). The natural variation for compounds containing isotopes of sulfur is ±0.003. Copyright, 1953, by W. Franklin Dove.

HERE ARE universal gustometric scales in ¼ log D-units for five primary taste solutions and for natural and processed foods and beverages. Spanned is range of dilutions from area of saturation to area of sublimal thresholds of perception of a difference in taste.

level of taste in various products in any locale.

Standards Needed

But before going into working details of the scale, a few words about why it was conceived and how it may be employed in the future:

Both need and use-value for such a scaling device became acutely apparent to Dr. Dove when he was "commissioned" by the Army, late in the last war, to help overcome the rather widespread rejection of certain high quality ration items by the soldier consumer.

True, field-acceptance testing and statistical analysis could pretty much pinpoint any taste aspect that caused popularity or unpopularity in a food. But it was well nigh impossible to define these to the contracting supplier.

What was actually needed was some sort of "standard taste level" established by consumer tests. This standard could thus be on hand continually as a bench guide for all batch productions, where it would be of

special value when new supplies or substitute ingredients were being used —as was common during wartime production.

A logical projection of this technique would then permit the coding of taste specifications for each food and ultimately a multiple code that would possess regional, national, and international significance in purchase orders and sales operations.

Postwar work by Dr. Dove in the realm of food acceptance in hospital feeding further piqued his interest in this need for taste standardization. Indeed, the tremendous influx of new processed and dietetic foods intensified his awareness of the problem.

It was boldly apparent that new machines and techniques were actually remaking our national diet and that a universal working method of taste classification was a long overdue "slide-rule" for this engineering-sponsored metamorphosis.

An exhaustive study of many past attempts to "calibrate" taste followed Dove's decision to attempt to develop this needed new scale standard. Over 90 detailed studies had been made, with thousands of taste tests on a large number of foods being reported. But while each scale may have been adequate for some narrowly defined purpose, none approached the desired universality.

It was apparent that the most promising methods involved gaging the dilution effect of the four primary tastes—sweet, sour, saline, and bitter. However, these employed a host of different stock solutions, including molar, molal, normal, grams by weight, etc. Also, scale divisions had equal diversity, being based on normal, arithmetic, and often logarithmic progression.

Prototype Scale

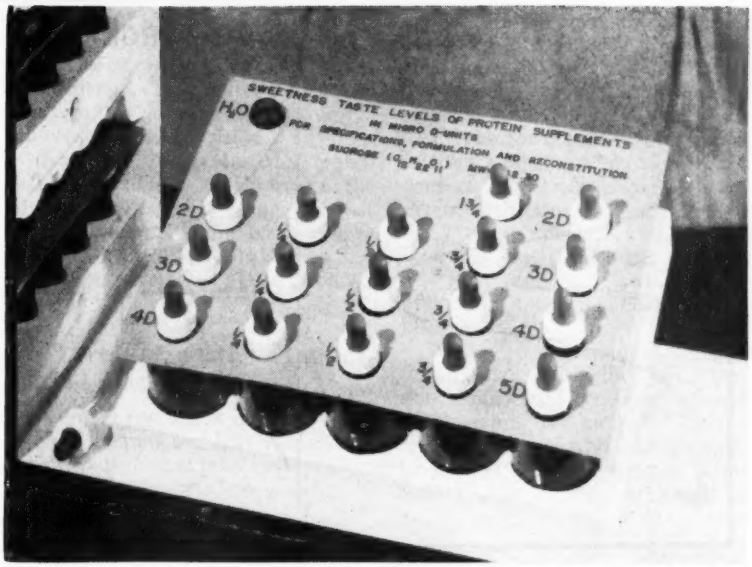
In setting up a prototype universal taste scale it was reasoned that there was needed some *fixed point of origin* that would permit statistical and comparative analysis between all foods.

This common denominator was almost too obvious. Why not start below the point of taste perception for the most penetrating or easily identified chemical solution and relate other, more elusive tastes to this on an extended, graduated inverse scale of dilution? This would permit a much needed centrality in relation to the universe of tasteable substances and the taste-sensing abilities of most organisms.

Values for calibrating such a scale posed another problem. A permanent value was needed—one not affected by solution variables, or differences in taste perception between individuals. This was solved by orienting the scale around the 1-molar solution (atomic weight of the chemical in grams dissolved to make 1,000g. pure water solution).

For food items with molecular weight beyond calculation, a natural food scale was developed that expressed normal weight or volume in parts to the whole. Concentration of the food is indicated by graduations above a fixed point of 100 parts, with dilution indicated in the lower projection of the scale.

Still another basic problem in designing the scale was its interval of calibration. It was apparent that such an interval must be adjustable to meet many different situations. A great deal of research led to use of the formula $\frac{1}{2}$" for dilutions, and 2" for concentrations—since these progressions can be readily made both arithmetically and logarithmically from the 1-molar central point of origin.



USING D-unit values from his table (opposite page), Dr. Dove set up this operational series of solutions to test acuity of hospital patients on various tastes. Checks were thus enabled relative to sweetness level in protein supplements, permitting exact formulation of sucrose in foods according to patient acceptance.

Fractional Advantage

An added virtue of the logarithmic scale of $\frac{1}{2}$" and 2" is its ability to fractionate at any point to provide even finer graduations to suit the stimulus level of the material or response level of the taster.

Three convenient "zones" of taste focus have been developed by progressive fractionating the D-unit scale —the so-called macro, micro, and ultramicro ranges.

Macro measurements are equal to D-units of full magnitude, secured by halving and doubling the concentration. Primary taste chemicals such as sucrose (sweetness), sodium chloride (saltiness), tartaric acid (astringency), and quinine sulfate (bitterness) can be gaged conveniently in these gradations.

Micro measurements represent intervals of $\frac{1}{4}$ and $\frac{1}{2}$ log size of the D-units. These reflect, for example, response to ingredients in foods and can be used for taste matching or developing taste level standards for quality control.

Ultramicro units—log fractions of $\frac{1}{8}$ to 1.64, or smaller if necessary—represent the finest subdivisions of D-units to which any organism will respond. Dr. Dove has found that human gustatory sensitivity to sucrose, for example, falls within this range and ranks along with vision and touch as one of our finest discriminatory abilities.

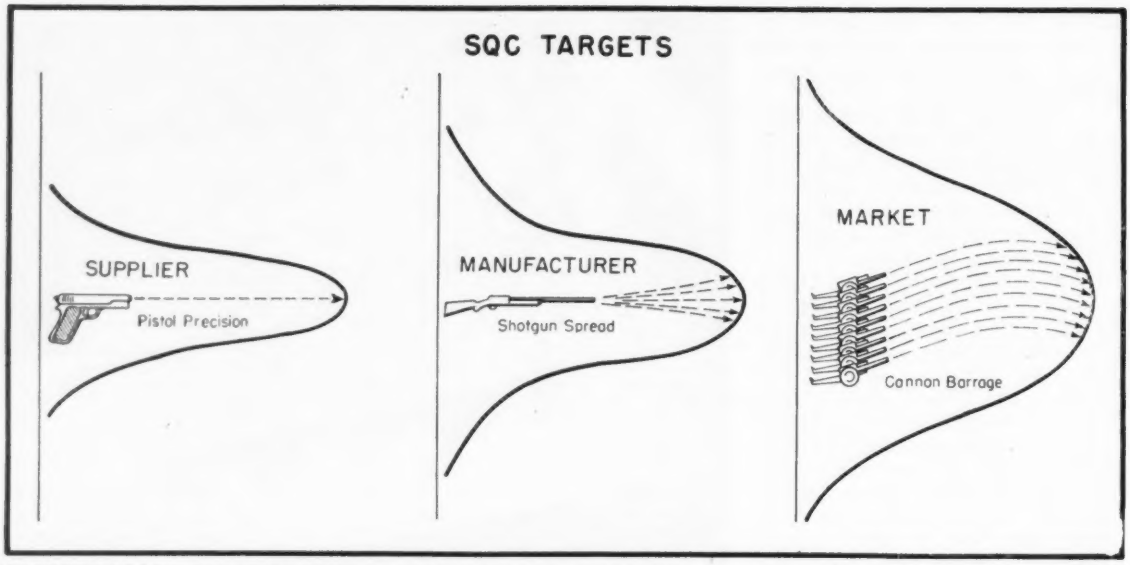
It is obvious from its manner of gradation that the D-scale could actually extend beyond the range of any taste stimulus. Further, that it also very possibly could be adapted to other chemical-sponsored senses, such as smell in man and animals.

Numerous Applications

While initial use of the Dove Gustometric Scale has been in such rather clinical problems as developing an acceptable protein supplement for hospital foods, its possibilities as a working tool for the food processor are intriguing.

Consider the surface value of the natural foods scale alone. This actu-

(*Turn to page 185*)



MARKET-TARGET RELATIONSHIPS in statistical quality control. Central area of market preference (curve on right) represents bulk of consumers, hence brewer (center) aims his product here and demands "pistol precision" on part of supplier (left) in supplying raw materials to assure top performance.

The Statistical-Control Technique

Management's "Radar"

By applying laws of probability plus frequency distribution curves, brewers are now winning—

- ★ **More uniform and desirable product quality**
- ★ **Growing economies in labor and materials**
- ★ **New savings in processing and packaging**

ROBERT I. TENNEY
Wahl-Henius Institute, Chicago

Profit and product in brewing—and indeed in most food processes—are like images in a split-view range-finder. Realistic management puts its sights on profit and tries to focus product quality into line. And only when the two sharply overlap is one really "in business".

Statistical quality control, then, might be considered a potent new type of range-finder for management—a "radar" offering speed and precision in aligning manufacturing with optimum economic return.

True, specific triumphs of the statistical approach in solving individual in-plant problems are legend. A midwest brewer cut bottling defects with less inspection, for example. Another significantly pushed up its extract value without changing formula. One plant slashed painting costs by 23%.

But it's the profound, overall upgrading that materializes when SQC is adopted as a management tool that is the big story. For when enthusiastically enforced by officers and supervisors, the technique invariably sharpens a company from stem-to-stern.

In brewing it is particularly important to stress this necessary management adoption of SQC. In this highly competitive field, wavering or misdirected quality has a history of contributing to loss of sales. And inept control of high-geared operations have led to many plant failures.

Management's concern with aligning product with profit can be logically developed in three stages: I—Targeting the Market; II—Evaluating the Product; III—Tightening Operations. As will be shown in the following discussion, statistical methods of analysis can often bring lucid simplicity to these complex endeavors.

I—Targeting the Market

Beer preferences can vary markedly. One beer type or quality level may please 68% of consumers; another, equally costly product, only 13% of the same group of buyers.

Hence it is public acceptance—rather than the desires of the brewer—that determines beer design. And to measure this factor as well as predict potential sales comprises a challenging job in statistical analysis.

The tools used by the brewer are familiar ones and the problem no different statistically from those of other fields. Essentially his product is being aimed at the central area of market preference (represented by the frequency distribution curve at the extreme right in accompanying drawing, "SQC Targets").

Actually, this representation of market distribution is a composite of several curves—one for each quality the brewer intends to control. He knows

it's unlikely that his product will completely satisfy, for any single item, much more than a range of preference which is from 2 to 2½ sigma-values wide on this curve. And some measurable items are even more critical than this.

It is, of course, not difficult to hit a target of 6-sigma width with a shot gun having a 2-sigma spread, but the most profitable response is obtained when the mean values are the same.

The center curve of our target drawing then represents the brewer's possibilities positioned most favorably to the market. Of course, he is not unique in this position, except perhaps for some fairly wide tolerances for product acceptability if the market happens to be large enough.

Now if the brewer has analyzed his market in this fashion, and recognizes the magnitude of variance within his own product, he will inevitably seek from suppliers those raw materials that best enable him to held his mean on target center. This leads to his requesting precise pistol shots from his suppliers, as indicated by the left-hand curve.

What Influences Buying?

So to target a market properly, certain significant product qualities influencing the buyer must be recognized and controlled.

This is an elusive problem with beer, where appearance of the package –label design and associated advertising–plays, of course, a big part. Yet even this factor lends itself to statistical evaluation. For brevity, however, our discussion will deal primarily with the more tangible in-plant control.

Flavor is the brewer's No. 1 controlled quality. Its regulation is usually achieved by balancing several constituents measured separately by either chemical or organoleptic methods. Bulk-blending, however, rather than ingredient control, is the usual way of minimizing batch-to-batch fluctuations.

What are the dominant forces, in flavor, that influence buying? To try to define some of these, a statistical study of qualities was made covering one typical brand over a year, and this was compared to a hypothetical beer that would have sold the most volume during the twelve months of 1952. This comparison is illustrated in Fig. 1.

To approximate this hypothetical, favored beer, a number of brands were analyzed each month–enough to represent at least 52% of the particular market–and actual value for each brand was multiplied by number of barrels sold. These figures were then added and a final value achieved by dividing by the total number of barrels sold. In this manner the market acceptance curves for this "ideal" beer are dynamic. They reflect total public reaction to advertising efforts as well as to composition and flavor.

Note the values for the typical brand–dotted line–as compared to the hypothetical beer. It is apparent that it was blended primarily to uniformity of body (Apparent Extract) with less respect to sweetness or even alcoholic content.

II—Evaluating the Product

Of course, the graphs in Fig. 1 present only a few of the qualities measured by brewers and hardly provide a definitive picture of public acceptance. But they do illustrate how a statistical analysis can pin-point formula or process laxity leading away from the desired norm.

Naturally, the final arbiter of beer flavor is taste testing. As far back as 1410, the town council of Hamburg instituted the *Probestecker*, which consisted of an official bi-weekly testing of beer from each new brew offered by the several hundred local breweries. Any failure in color, taste, and body resulted in confiscation to protect the town's reputation for good beer.

While few brewers today require such a drastic survey, there is no doubt that many could occasionally benefit by developing the method.

Take a company producing a popular beer in a certain manner. A proposed change in process is thought de-

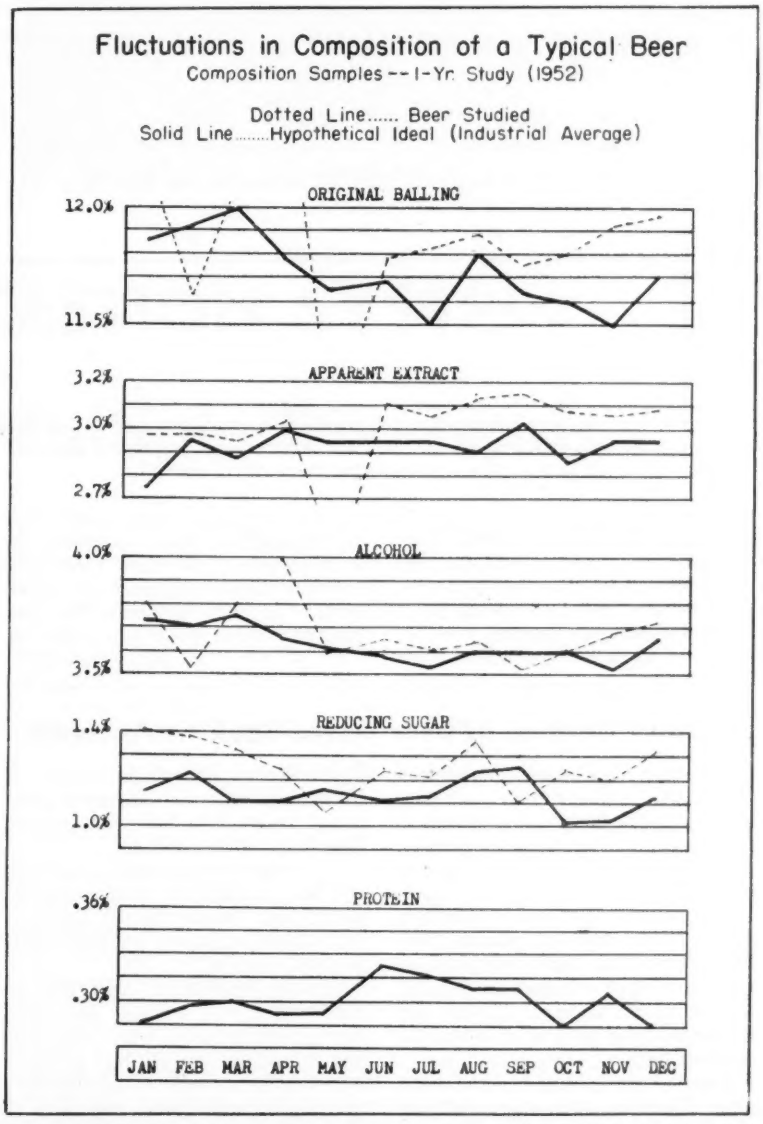


FIG. 1—COMPARISON of a specific brand of beer with a "hypothetical ideal" based on industrial average in same market area. Note deviations.

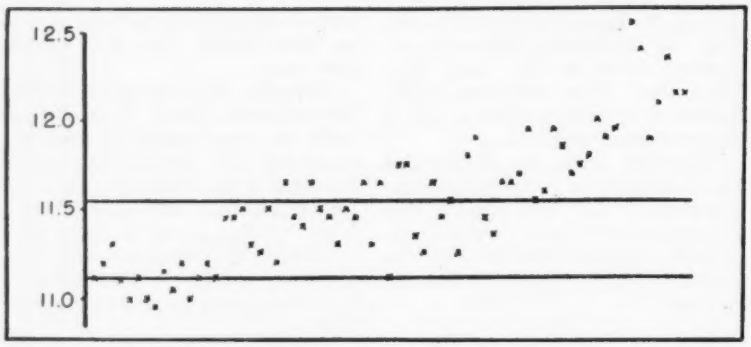


FIG. 2—PLACING wort extract on a control chart at Brewery "A" caused attendants to compete. They upgraded extraction values above expected limits. Solid lines indicate intended range.

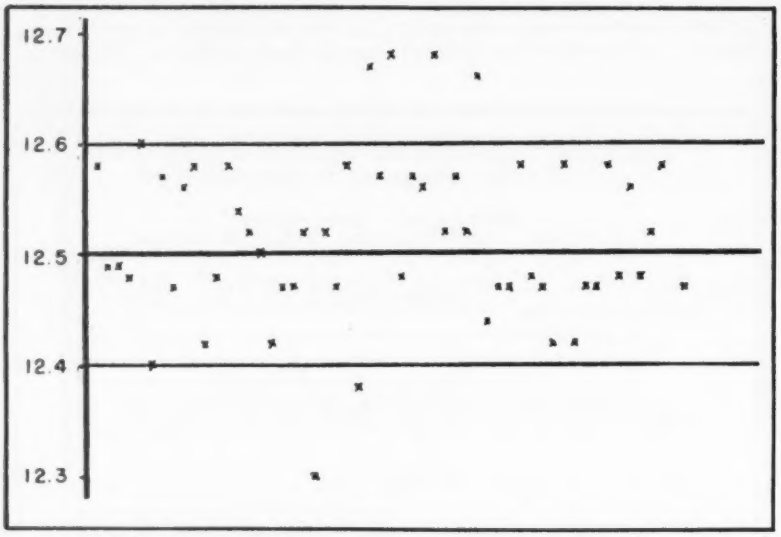


FIG. 3—CONTROL charting of wort extract at Brewery "B" boldly depicted careless errors in formulation but indicated fairly good control.

sirable, but question arises as to whether it will affect the flavor. Consequently, the standard and the proposed product are compared by a company "expert" and decisions are based on that individual's reaction.

The above is not peculiar to brewing, but is typical of how production superintendents, plant managers, or business owners can allow their preference to dictate what they sell to the public. In many instances this has brought success to a beer. But all

(*Turn to page 213*)

Quality Control of Beer Dates Back to Ancients

Although traditional conservatism commonly "holds a rein" on new scientific tools, brewing has proved itself quicker than other contemporaries, down the ages, in utilizing quality control.

The brewer is perhaps best entitled to use that oft-heard phrase, "We have always had quality control." A great amount of skill has been directed to control of beverages brewed and fermented from grain since before the dawn of history.

Granted, the ancient builders of the Great Pyramids were mathematically adept. Even so, it's hardly conceivable that any figure-wizards of 4000-B.C. Egypt applied laws of probability or frequency distribution curves in processing millet into *hek*, the popular forerunner of beer and ale.

Yet even before that day, brewing had been established on an industrial plane, with responsibilities for control of quality having its own hieroglyphic character.

Papyrus descriptions have told of numerous flavors available and have attested that measures were taken relating to quality control. Just as spices and condiments were found useful in covering the malodorous condition of tainted foods, so too strongly flavored ingredients were mentioned as desirable in maintaining a more uniform and reproducible flavor in ancient beers.

In fact, the use of strong flavors and rigid adherence to empirical procedures remained the only elements of control available for centuries.

Chance dictated much of the beer character. Success was gaged solely in terms of long runs of favorable influences but was termed "skill". Each fermentation could be caused by any of a host of the different microorganisms in the surrounding air.

Thus the character of fermentation was greatly influenced by chance. Not until Pasteur's work in 1859 and Hansen's studies a few years later could brewers purposefully select strains of the more desirable yeasts. Pure cultures have been used in this country since 1892, upping beer quality.

Today, the development of ideal yeast variants calls for the highest statistical skill as the geneticist manipulates a multiplicity of genes in increasing permutations for study and test. The biologist assumes statistical approaches with much greater ease than the chemist or engineer who have been taught definiteness.

Search for better covering flavors continued slowly throughout early history but culminated in the choice of the delicately aromatic hop by about 1500. The previous 300 yr. had seen a steady increase in the use of hops, as compared to rosemary, marjoram, anise, and yarrow, previously popular. The choice was fortuitous, for extractives of the hop plant have rather definite antibiotic properties and have assisted in maintaining yeast purity.

It was also in this era that the thermometer came into being along with the hydrometer and other devices. These instruments were promptly adopted to measure brewery conditions—a first step in any control program. As new tests and measures became available they were turned to use by brewers. Trading of methods across industries stimulated the old art in its growth into a technology.

Among brewers' contributions to the general field, mention must be made of the articles that appeared under the pen name of "Student." Actually, this writer was the statistically inclined W. S. Gosset, head brewer for Arthur Guinness Co., maker of fine ale. He used a *nom de plume* because company policy at that time frowned on employees writing technical papers. Incidentally, it was Gosset who gave us the "t" test for significance.

Today, brewers are pioneering in the sphere of statistical quality control with a success that bids fair to see striking progress crown the efforts in the near future.—*R.I.T.*

SUGGESTION AID BOOTH is routed through plants, accompanied by personnel trained to encourage employees to turn in ideas and guide them in clearly expressing them.

From top vice-presidents to local plant supervisors, National Biscuit's management is constantly busy at the job of making the company suggestion system work. Result: It does—thus providing not only valuable improvements in the operating ways-and-means but also unbroken lines of communication both up and down

SUGGESTION SYSTEM Pays Multiple Dividends

IVAN C. MILLER
Associate Editor, "Food Engineering"

Many have been the suggestion systems tried by food manufacturers—only to die young, condemned as failures, usually because of two errors.

Too often the plan for the system was ill-conceived. Or else, because neglected, was weakened by lack of nourishment.

National Biscuit Co.'s suggestion system was first studied and planned in minute detail. And after adoption it was relentlessly executed.

Accordingly, it has paid off with many benefits. Here are a few:

1. Real savings through improved production techniques and methods
2. Elimination of accident hazards
3. Reduction in waste and spoilage
4. Rapid and dependable two-way communications
5. High level employee morale

Vital to success in starting or revising a suggestion system is long and studied thought on elements fitting the company's needs. NBC chose a system built around full identification of the suggester, in preference to an anonymous system or one where suggester is known only to a committee or a secretary. Here, experience indicated that the name-credit system generates more cooperation and better communications, and higher employee morale.

Once the plan was established, all employees were provided with a booklet explaining in adequate detail how the suggestion system operates. All new employees receive this booklet.

Probably the most valuable fact learned through the seven years the system has been in operation is that it can be kept at profit-return status only when nourished by constant, unrelenting, "hammer-it-home" promotion. It's required that employees be "sold" on idea-thinking and contributing suggestions with as unceasing an effort as is given to selling the company's products.

Shows Way

National Biscuit Co.'s experience in devising, installing, and maintaining a highly profitable suggestion system — one that is continually productive through the cooperation and participation of a high percentage of the employees—should aid other manufacturers in making plans for installing a suggestion system or for overhauling and refabricating a system now in use.—*The Editors*

The S.S. Booklet

Much of the company's successful method can be gleaned from the aforementioned suggestion-system booklet. Leafing through it, we find the purpose of the system is to encourage employees to think constructively and submit ideas that will aid in the progress, efficiency, and welfare of the company and its employees. Particularly it—

POSTER theme may be based on a current event, hot news, anything that will command interest. Equally important is constant change. Never permit promotional effort to lapse.

▶ Assures employees that all their suggestions will be thoroughly investigated, with careful and complete consideration being the standing rule.

▶ Agrees to accord proper recognition to employees who give thought to the problems of the company and submit constructive suggestions for improvements.

▶ Confirms the payment of cash awards for suggestions adopted and put in effect under the provisions of the plan.

The policies of the suggestion system are formulated and approved by the General Suggestions Board, which meets weekly at the company's main office. Among the members of this board, which is appointed by the president, are: 1. The Vice-President for Personnel Relations, 2. Executive Vice-President and Assistant to the President, 3. Vice-President for Operations, 4. Vice-President for Finance, and 5. Vice-President for Sales. As noted, the system is a fundamental concern of top management.

A suggestion is defined as any definite proposal containing a constructive improvement idea that would be of benefit to the company and its employees. It can be either new and original, or propose a special application of an old idea. It may relate to a way to better the company's methods of conducting any of its activities or the use of its equipment.

Eligible suggestions are those that may improve manufacturing or packaging methods, equipment at present in use, appearance of products or packages, storage or shipping methods, control of stocks, accounting practices or forms, and housekeeping methods.

Considered, too, are ideas for increasing sales, production, cooperation. Also those which combine operations or reduce costs, waste, labor, and accident hazards.

Encouraged are ideas for eliminating spoilage, breakage, duplication, unnecessary handling. Also solicited are proposals for new products, new methods and equipment, ways to save materials, and new merchandising plans.

Discussed next in the booklet are those types of suggestions that won't qualify. Then there's the admonition that "a mere statement that an operation or a method should be corrected will not be considered for an award. To be considered, a suggestion must contain an idea for effective improvement or benefit."

BOX for suggestions should be placed where workers pass oftenest.

Who is Eligible?

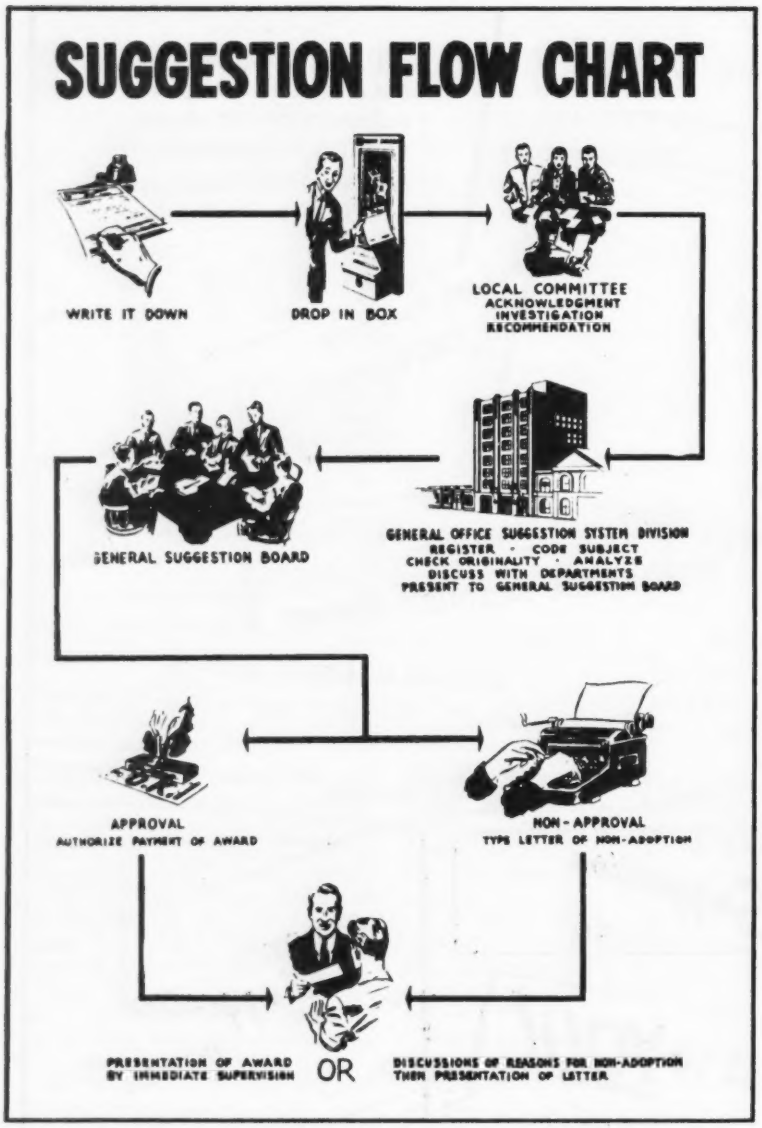
Most employees, including those on pension, are eligible to receive cash awards for any submitted suggestions that are adopted. This includes all employees whose wage rate is on an hourly basis, salaried employees not having administrative or supervisory duties, salesmen, cashiers, shipping clerks, work foremen, and working supervisors.

Not eligible are officers or directors of the company; general office department, or departmental division, managers; employees of the Suggestion System Division; division and assistant division sales managers; managers, assistant managers, and superintendents; assistant superintendents of bakery, shipping, branches, plants, and mills.

However, employees who devote their entire time to supervision are specially eligible to receive cash awards if such adopted suggestions are judged to be over and above the expected scope of their normal duties and responsibilities.

Included in this group are those

Suggestion COMMITTEE REPORT
PRINTED FORMS are essential to proper submission of ideas, routing, filing, evaluation, and awards. But number should be limited to need.
Suggestion ANALYSIS
PLEASE EXPEDITE!
EMPLOYEE'S Suggestion INVESTIGATION
MONTHLY Suggestion COMMITTEE ACTIVITY REPORT
NOTICE OF SUGGESTION ADOPTION
EMPLOYEE'S Suggestion FORM
NABISCO
ADOPTED Suggestion NOTICE
WE'VE GOT TO HAND IT TO YOU!
IT'S YOUR AWARD CHECK FOR AN IDEA WHICH HAS BEEN APPROVED FOR ADO
THANKS FOR YOUR PARTICIPATION IN THE NABISCO SUGGESTION SYST
THINK and SUGGEST
AUTHORITY FOR PAYMENT OF CASH AWARD
THANK YOU !
HERE'S A RECEIPT FOR YOUR SUGGESTION
Suggestion Committee
FILE COPY
THERE IS ALWAYS A BETTE



FLOW CHART, printed on back of booklet explaining system, indicates to employees the careful consideration accorded their ideas.

with such titles as foreman, assistant foreman, forelady, supervising engineers, branch personnel managers, sales branch managers, special representatives, sales representatives, special salesmen, auditors, office managers, administrative cashiers, bread sales managers, and bread route supervisors.

Further details are provided to establish who qualifies and under what circumstances. Also to demarcate those who can never qualify or who may only do so under specific conditions.

The Route of a Suggestion

All ideas must be submitted on a standard blank form, a supply of which is maintained at each suggestion box. Only one should be submitted per form. However, there is no limit to the number that may be turned in by an employee at any time, and many have contributed "in multiple." In fact, one employee has the record of submitting over 150, and a good number of them have been adopted.

The instructions tell the employees to be certain their ideas have been carefully thought out. They are then advised to—

1. Secure a blank from the suggestion bulletin board. (Complete instructions regarding the use of the form are given on its reverse side.)

2. Write the suggestion as carefully and clearly as possible, stating just what the idea is and what it is intended to accomplish. All information requested must be given and the form signed by the suggester. In some instances it may be advisable to enclose a chart, sketch, or the like.

3. Seal the form after it is completed and deposit it in the most convenient suggestion box. When assistance or advice is needed in making a submission, an employee should consult his department head or manager. Perhaps a discussion of the idea behind the suggestion will aid in writing a clearer statement of its intent. Management will help and advise without detracting from the credit, or from the amount of the award.

How Ideas Are Processed

Daily collections are made from all boxes, and the date is noted on each suggestion so that in the event of duplicates from more than one employee, priority can be determined.

All suggestions are forwarded to the Suggestion Committee in the plant where the idea originated, and all are given identifying numbers. Receipt of suggestions is then promptly acknowledged by the Committee.

As soon as possible, the suggestion is impartially and completely investigated by the Committee. Sometimes a member may be assigned to discuss the idea with the suggester, so that it may be more fully understood. This discussion may add to the merits of the idea. In any event, the suggester will still get full credit.

On a form provided, the Committee then reports on the value of the suggestion and the need for its application in the local plant. This form is then sent from the local plant to general headquarters, accompanied by the employee's suggestion form.

After the headquarters Suggestion System Division has studied the idea and the committee's analysis and recommendations, it is submitted for further consideration by the specific general office department that should be interested—accounting, production, engineering, or whatever. Final disposition is made after a thorough study and consideration by the general Suggestion Board made up of top company executives and the heads of the Suggestion System Division.

It is vital to handle suggestions as promptly as possible. It takes 30 to 60 days for complete processing of most ideas. If time studies or trial tests are required, a longer period may be necessary. However, if for some reason consideration of a suggestion requires unusual delay, the suggester is advised.

Determining Cash Payments

Minimum award is stated as $7.50, maximum $2,500.00. Size of the

award is determined by the value of the suggestion to the company.

If the worth of a suggestion can be definitely measured in dollars and cents that can be realized, such value is considered "tangible", and the cash award is determined by the value of savings in material and/or direct operating cost.

Cash award for a suggestion of tangible value is paid at the rate of 10% of the value of savings during the period of one year from the date the suggestion is first placed in use by the company, not to exceed the sum of $2,500.00. After a suggestion has been in use for one year, results are reviewed. If the study at the end of the year indicates the suggester is entitled to a larger cash award than originally paid, the additional amount will be determined and approved.

Where such precise values can't be determined, the idea is considered as an "intangible". This may be of the type relating to sales or merchandising ideas, safety, certain methods, practices, etc.

Often, the intangibles prove of decided worth to the company. Difficult though it may be to determine, the value of such ideas must be established and payments made accordingly.

Each suggestion is regarded as "in effect" for two years after submitting, even though not approved. At the end of the two-year period, the idea may be resubmitted for another two-year period.

The booklet also explains the split-cash type of award employed when an idea is jointly submitted. It is also emphasized that retired employees of the company may participate on an equal basis with regular employees.

Although the booklet points out that tax deductions are taken from the cash awards, since they represent income to employees, nevertheless, cash awards are not considered as salary, wages, or earnings in respect to pensions, group insurance, etc.

When, after full consideration, a suggestion is not adopted, the Suggestion System Division writes a letter directly to the suggester explaining the reasons. Further, the Committee then assigns one of its members to explain fully to the suggester why the idea was not adopted. If, during the explanation, any pertinent facts not previously considered are revealed, additional consideration will be given the suggestion.

Not infrequently, the explanation may assist the suggester in further developing an idea to a degree that would qualify it for adoption, in which event the suggester is encouraged to revise his idea and re-submit it.

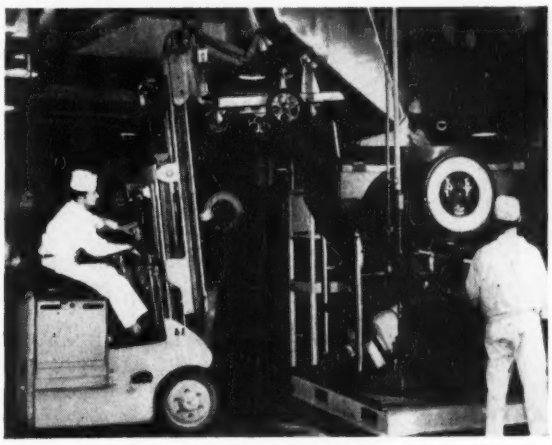
The booklet emphasises that even though an idea is not accepted, the fact that it was submitted is fully appreciated as proof of an employee's cooperation in giving thought to his work or the activities of the organization.

Constant promotion has been mentioned as top-essential to the success of a suggestion system. Here are some of the stimulating vehicles employed

(*Turn to page 189*)

● ● ●

Working from hoppers . . .



. . . to pasteurizers—

Electric Trucks Fill Gap in Process Line

FE STAFF

During production of its processed cheese in the Sacramento Boulevard plant, Chicago, Kraft Cheese Co. makes prime use of the unit load principle.

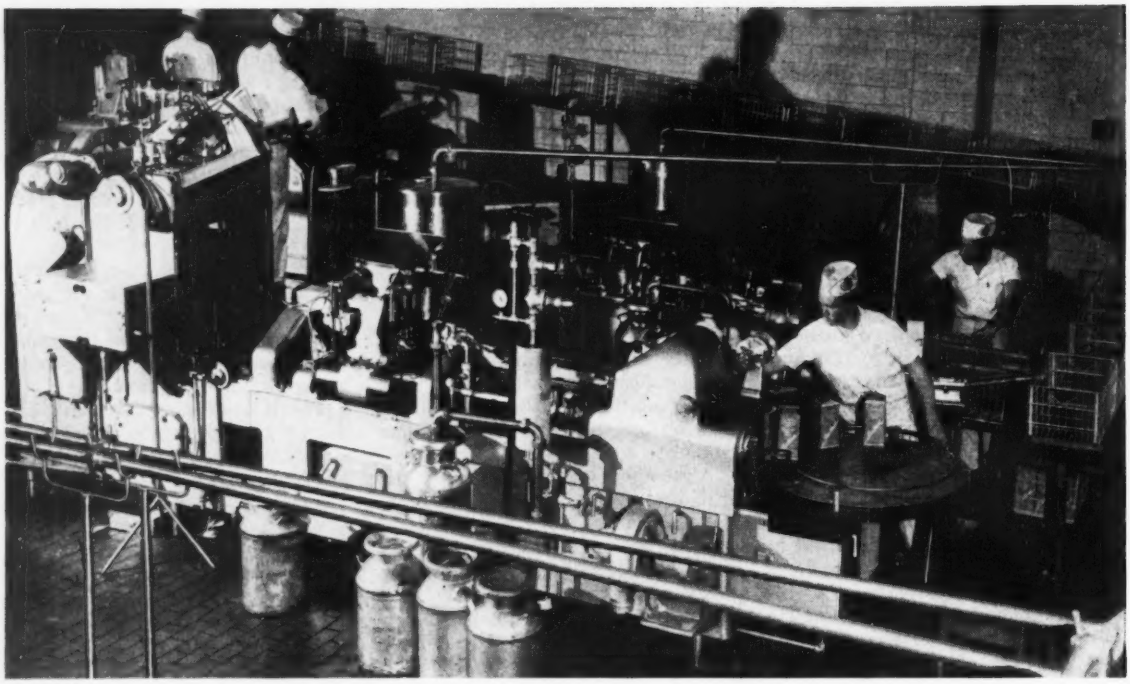
It employs electric fork trucks to move wheelbarrow-like "bucket trucks," filled with a blended cheese mixture, from stainless steel hoppers on one side of the room to stainless continuous pasteurizers in center.

Trucks are equipped with a specially designed attachment for dumping the cheese mixture into the pasteurizers. Two of these trucks service 7 pasteurizers and 8 hoppers, occupying most of the area in a 175 x 100 ft. room. A glass-enclosed area in the corner is devoted to quality control and testing.

Having moved a cheese-filled bucket truck from the hopper to a pasteurizer, the driver raises the bucket and, on signal, dumps the mixture into the pasteurizer. Weight of the loaded bucket is 1,000 lb.

The entire operation takes place on a fixed schedule, integrating trucks, hoppers, and pasteurizers. Careful timing is essential for consistent product quality.

According to John W. McReynolds, materials handling director, this dumping operation was "built around the special fork trucks." And he cites man-hour savings and high standards of cleanliness as proof of its efficiency.



DESPITE many items turned out, complexities are minimized in the Southern Dairies Charlotte plant. Here we see two Pure-Pak machines turning out paper containers filled with pasteurized milk. Clean cases (rear) move to filler discharge from adjacent washroom. Filled cases are conveyed through rear wall to refrigerated room.

Single-Product Benefits ⋮ *Multi-Product* Plant

Design enables simultaneous ice cream and milk processing operations in same area without interruptions or conflicts

ARTHUR V. GEMMILL
Senior Associate Editor, "Food Engineering"

High degree of perfection has been attained in continuous, straight-line, one-floor milk processing and ice cream-making operations at the new plant of Southern Dairies, Charlotte, N. C.

And the advanced layout is already paying off with these single-product type advantages:

- **Easier supervision**
- **Better utilization of labor, and**
- **More efficient use of refrigeration, power, and steam.**

The new plant is a 2-story red-brick building of Southern colonial style. All processing, receiving and storage areas, plant offices, and rest rooms are on the first floor. Second floor is used exclusively for the company's general offices, just moved from Washington, D. C. And the basement contains refrigeration and boiler rooms, cabinet storage and repair departments, electrical control room, and other utilities.

Basement is accessible to trucks by means of a ramp leading to the cabinet department. In this way, cabinets readily can be moved in and out, and additional refrigerating machines, boilers, and other equipment, can be easily moved into place.

Durability and Sanitation

Walls of processing and milk receiving rooms are of buff colored, ceramic structural tile, and floors in these areas are of red quarry tile set in Furnane (Atlas Mineral Products Co.) for maximum durability and sanitation.

Ice cream making and milk processing are carried out in a 7,000 sq. ft. area in the center of the building. Operations are entirely separate, however, and are performed with a minimum of interference to flow lines (see accompanying full-page drawing).

This area is flanked on the south by the main entrance and lobby, plant offices, rest rooms, lunch room, and a large dry-ingredient storage. On the west, are refrigerated rooms—the 7,300 sq. ft. —20-deg. F. ice cream hardening room, and the 1,055 sq. ft. milk cooler—and case storage and washing rooms.

On the north is another large, 3,400 sq. ft., storage for milk supplies, and on the east are dairy products receiving and storage rooms, mix assembling room, and kitchen for preparing fruits, nuts, and special ice cream forms. A receiving platform extends 161 ft. along this side and provides direct access to the previously mentioned

rooms and to the two storage rooms.

This arrangement—processing areas in the center—minimizes the distance supplies and product must move to processing, and finished products to delivery vehicles, thus enabling continuous, uninterrupted flow.

Ice Cream Making

To demonstrate how smoothly this flow proceeds, let us examine the ice cream making operation:

Dairy products, in 10-gal. cans, arrive from country manufacturing plants and are conveyed to the 35 deg. storage room, which is adjacent to the mix assembling room. When needed for processing, cans are conveyed to the dump tank in the mixing room, where they are emptied. Cans and lids go through a straight-line washer and are discharged to the receiving platform.

Products are pumped to one of two 500 gal., vertical, agitator-equipped, stainless steel mixing tanks, where dry ingredients such as sugar, stabilizer, and chocolate are added. (Liquid sugar has been unobtainable at this plant, so granulated cane sugar in 100-lb. bags is used.) These dry products are palletized when received and placed in the south storage area. When needed for processing they are moved to the mixing room by a fork truck.

In line with present advanced practices, HTST pasteurization is used for both milk and ice cream. For these operations plate-type, regenerative heat exchangers are employed. However, high viscosity of the ice cream mix precludes use of the plate unit for complete cooling. This is accomplished with a cabinet-type cooler using water and ammonia.

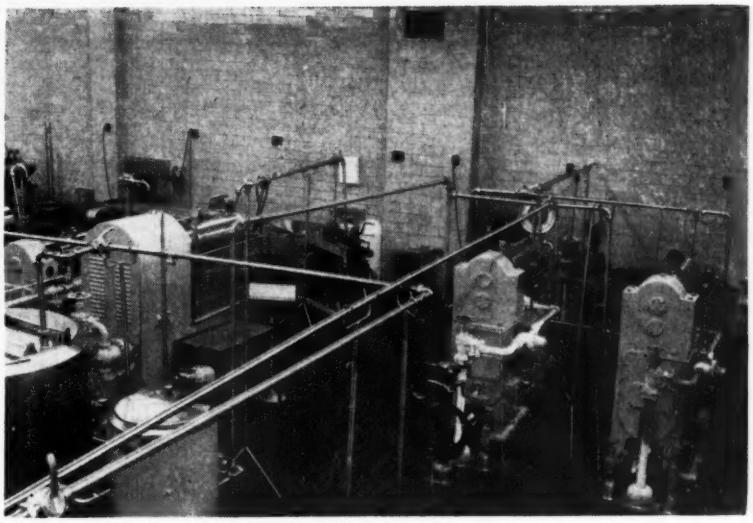
Mix ingredients, assembled in the mixing tank, are circulated through the regeneration section of the plate unit until a temperature of 160 is reached in order to insure suspension of solid products. Then the mix is pumped to the 1,000 gal. homogenizer, which forces it through the final heating section of the plate unit.

After holding for 25 sec. at 180 deg. in the 4-in. tube mix is returned to the plate unit, where it gives up a part of its heat to cold mix being circulated from the other mixing tank. Final cooling, as stated above, is by flowing over plates of the cabinet cooler. Mix is then pumped to one of the six vertical cold-wall storage tanks, where it is tested for fat and total solids and, if necessary, standardized.

When needed for manufacture of ice cream, the mix is pumped from a storage tank to one of the six flavor vats (supplying the seven continuous freezers), where desired colors and flavors are added. Freezers discharge to bulk and package filling equipment located along wall of hardening room.

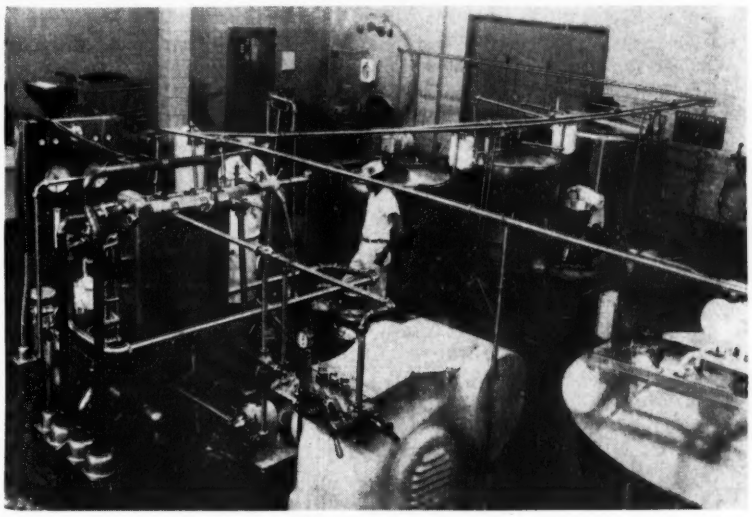
A 72-mold brine tank for production of frozen novelties, and a Vita-Freeze unit that automatically coats and bags the chocolate covered items completes the ice cream making setup.

Cans and packages of ice cream, and packaged novelties are conveyed directly into the hardening room with a minimum of exposure to room temperatures.



Ice Cream

FREEZERS (right foreground) feed bulk-filling unit (directly behind). Cans are check-weighed as they move to hardening room. Other freezers (left) supply pint filler (center rear), cup machine (left rear), and novelty unit (not shown). Grilles in rear wall provide for air circulation.



Milk Processing

RAW MILK moves from storage tanks in rear wall through plate pasteurizer and homogenizer (foreground) to surge tanks (one shown at right). Byproducts are processed in vertical vats (center).

In the hardening room, products are stacked on pallets and moved to desired locations by an electric fork-lift truck. Loads for delivery trucks are assembled on pallets and trucked to the loading platform on the other side of this room.

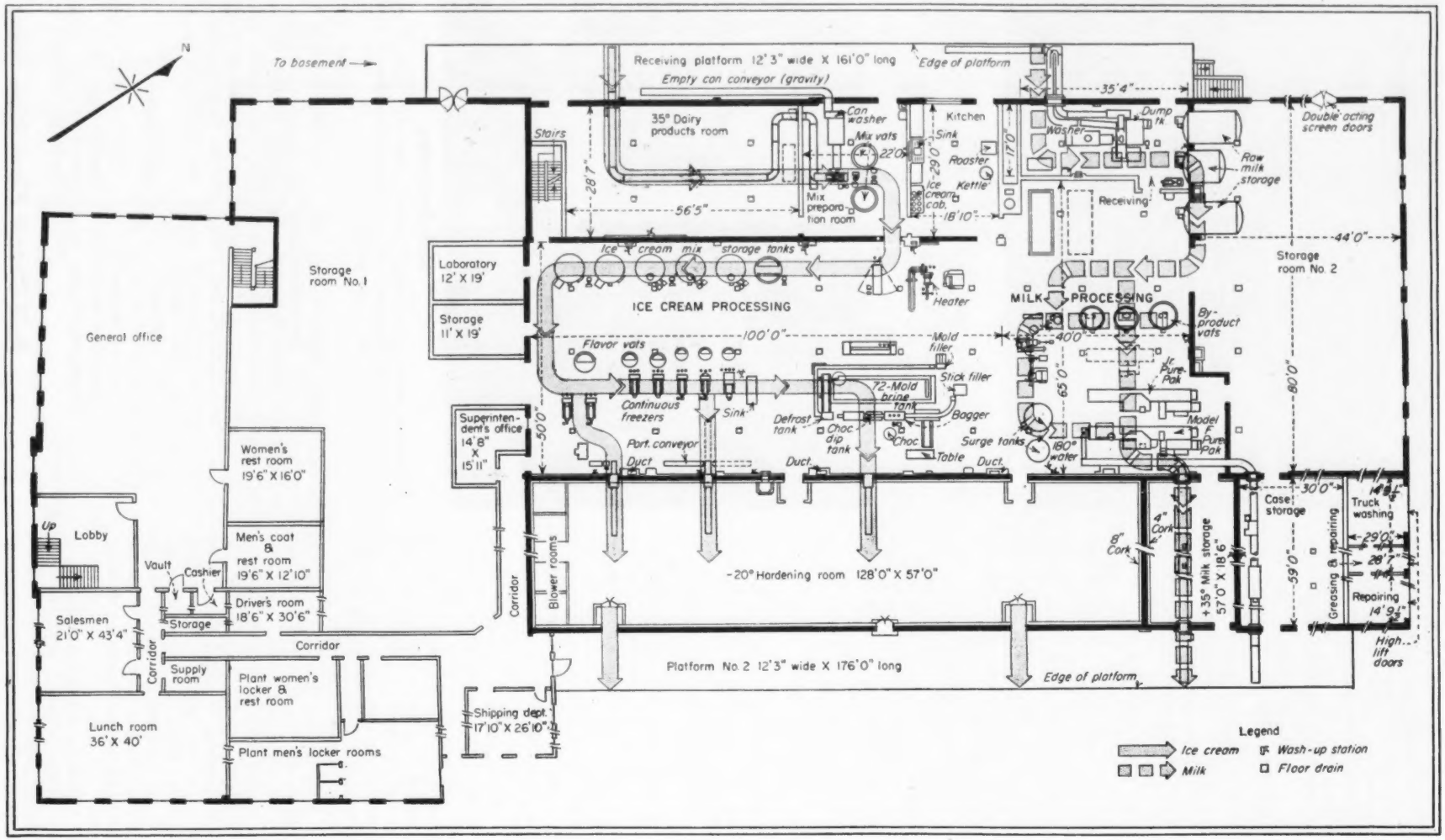
Milk Processing

Flow of milk through the area is similarly streamlined. The milk is delivered in 10-gal. cans directly from farms and unloaded onto a conveyor

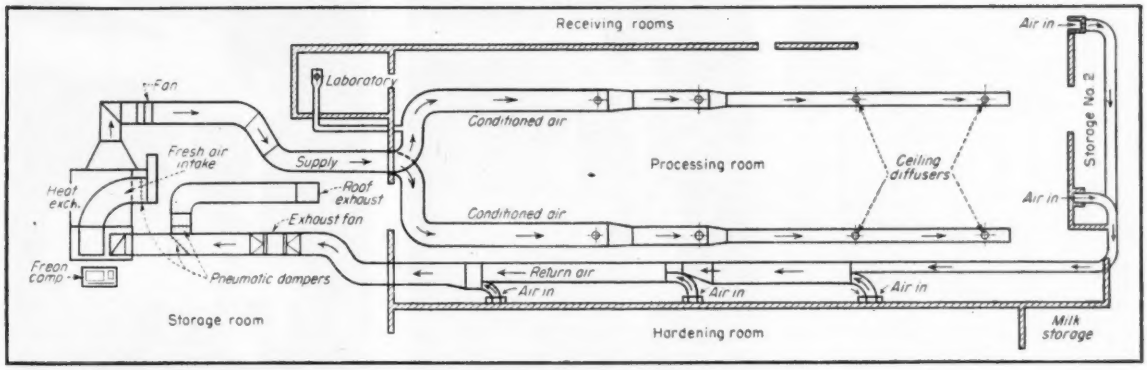
Full-Detail Flow Plan Next Page→

Central Processing, Separated Flow Feature New Plant

Continuous flow of ice cream (solid stippled lines) and milk products (broken stippled lines) from receiving platform to refrigerated storage rooms earns top operating efficiency for Southern Dairies' new Charlotte plant. Proximity of storage rooms to processing area minimizes supply lines.



How Process Area Conditioning System Operates



UNIFORM temperature and humidity in processing area is maintained by circulation of air through ceiling enclosed ducts from conditioning equipment in storage room (left). Air enters from diffusers in ceiling, leaves by ducts located in wall columns near floor. From 25-75% of return air is exhausted to atmosphere. Remainder is mixed with fresh air, passed through heat exchanger and returned to processing area.

on the receiving platform. Cans move into the receiving room, where they are dumped into a weigh tank, washed, and returned to the platform. Milk is pumped from weigh tank to one of the horizontal, cold-wall, raw milk holding tanks. (There are three of these tanks—two 3,000 gal. and one 2,000 gal. Their stainless steel fronts are set in the tile wall of the receiving and milk processing rooms. Bodies of tanks extend into the dry storage room.)

For processing, milk is pumped from a holding tank to a Sharples standardizing-clarifier, which removes extraneous matter and discharges milk of a uniform fat content to the plate heater. Homogenization of the milk is performed between regeneration and final heating. Following holding at pasteurizing temperature, milk returns to the plate unit for cooling, then goes to one of the two surge tanks (1,000 and 500 gal.) that supply filling machines.

All milk is filled into paper bottles. Two fillers are used: a Jr. Pure-Pak (capacity 25 per min.) that handles ½-gal. containers, and a Sr. Pure-Pak (capacity 64 per min.) that will fill qt., pt., and ½-pt. containers.

These machines form the containers from die-cut unwaxed blanks, convey them through a bath of melted wax where they are completely coated, then through a cooling tunnel to set the wax. This is followed by filling and sealing.

Empty containers are stored in the area adjacent to the milk room, where they are easily accessible to fillers.

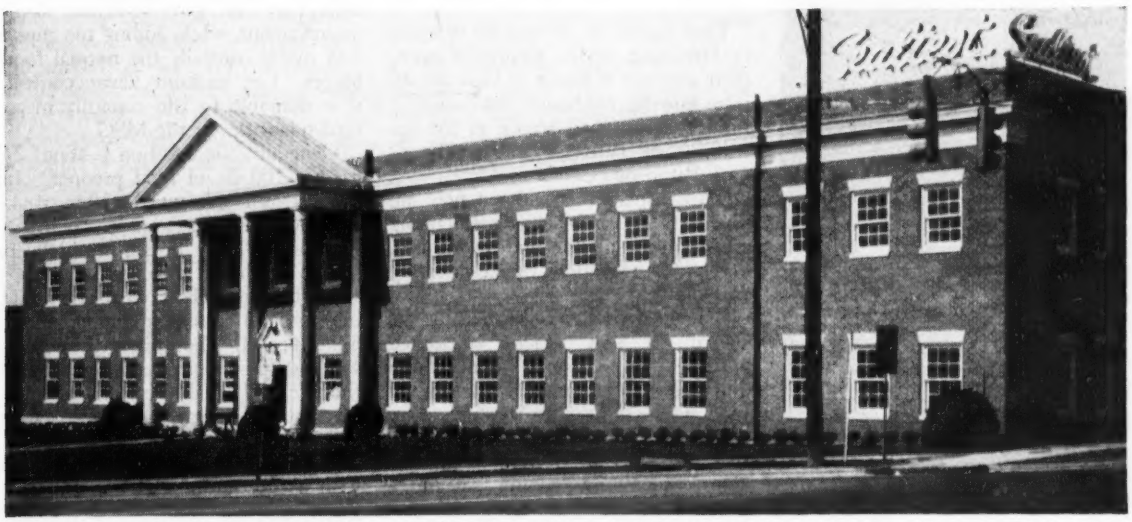
All cases are of steel wire. These are cleansed in the case washing room and conveyed through the wall to discharge end of fillers. Here they are loaded with filled bottles and conveyed into the milk cooler.

Buttermilk, chocolate milk, and cream are prepared in three byproduct tanks and filled in the Pure-Pak units. An 810-gal. Damrow cheese vat is used for preparation of cottage cheese, which is filled in wax containers.

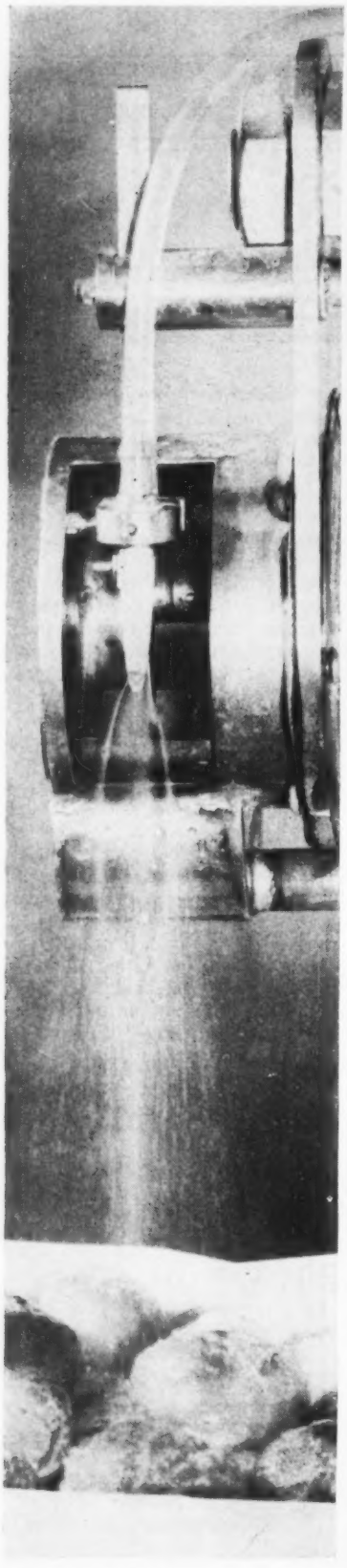
Provision for expansion of the milk processing operation was made by designing spaces for an additional Pure-Pak filler, a second standardizing clarifier, and for another cottage cheese vat. And even when these are installed there will be ample room for extra byproducts tanks and equipment for the manufacture of other products such as sour cream, processing of which is to begin immediately.

To maintain the desired −20 deg. temperature in the hardening room, four King refrigeration units, each

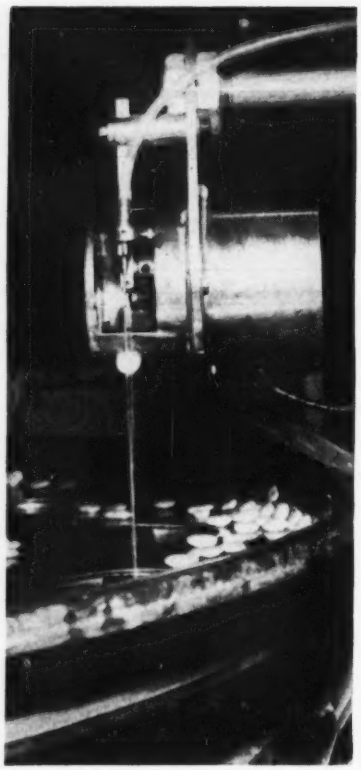
(Turn to page 247)



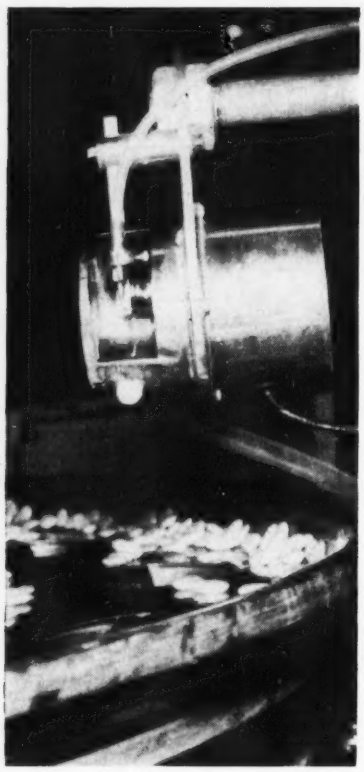
ATTRACTIVE SOUTHERN COLONIAL architecture gives no inkling that this is a modern dairy plant. First floor houses two streamlined processes—ice cream and market milk. Second floor contains company's general offices.



SPRAYS measured amount of solution into package of frozen food.



STREAM from nozzle puts 2 cc. of solution into turret-type-filler space.



FLOW STOPS when solenoid-operated deflector diverts solution to reservoir.

Adds MSG Solution

Precision dispenser sprays or jets liquids into

FE STAFF

First unit to be devised for spraying or streaming small, accurately measured amounts of liquid, at high speeds, into moving containers was successfully used this past season in the operations of Patterson Frozen Foods Co., Patterson, Calif.

This dispenser provides a new approach to the problem of maintaining a constant liquid flow and diverting it, except for accurately timed intervals, with no drip-loss.

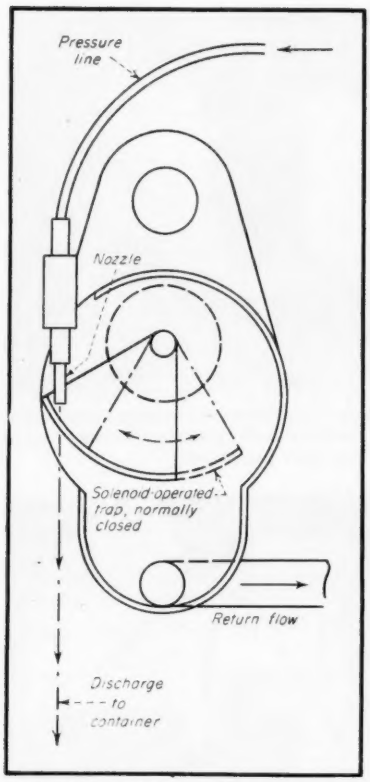
The new unit was specifically designed to add exactly measured amounts of Ac'cent (monosodium glutamate) solution into cartons of food products prior to freezing.

▶ It is anticipated that the unit will find use in other dispensing applications, such as adding measured amounts of food flavoring, ascorbic acid, brine, or syrup.

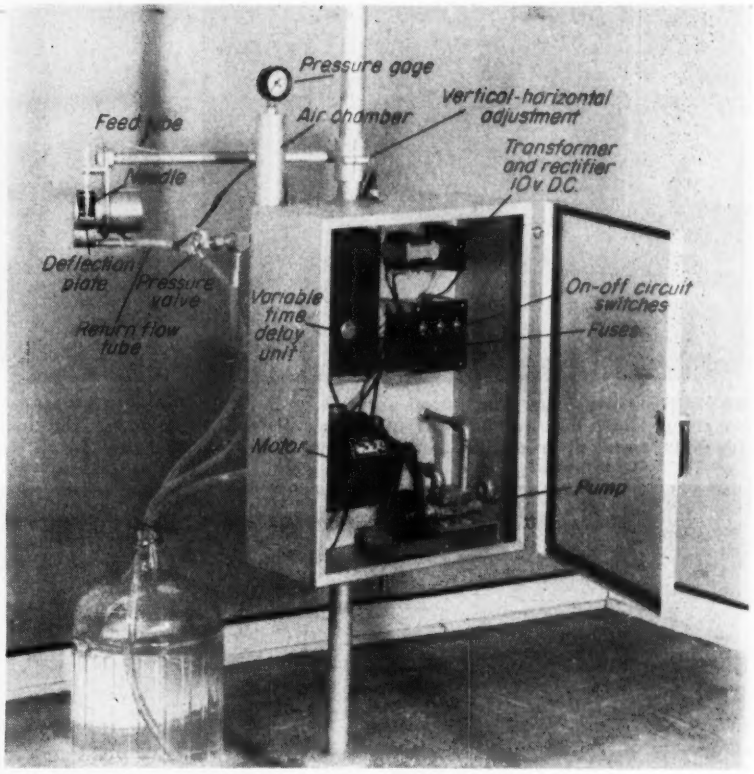
Monosodium glutamate, like many other food additives, should be used in controlled amounts. Adding too little may not give sufficient flavor improvement, while adding too much may overly intensify the normal food flavors. For uniform flavor control, it is desirable to add carefully measured quantities of the MSG.

Generally, the addition is about 2½ oz. per 100 lb. of food product. In the case of lima beans in a 10-oz. package, this amounts to 2 cc. of 30% solution. The dispenser delivers amounts of liquid with less than ±2% error by precisely controlled liquid pressure and automatic timing of the filling period. The unit at the Patterson installation has been operated at the rate of 75 to 100 cartons per minute, but it is designed to run at speeds as high as 400 cartons per minute.

A package-type unit, it is equipped with a tiny, motor-driven pump that draws solution from a reservoir and feeds it uniformly at 20 psi. to the spray nozzle. Constant pressure is ac-



PIVOTED TRAP intercepts flow after measured amount is dispensed.



COMPLETE dispenser. First unit to measure small amounts of liquid into moving containers at high speed.

At Packaging-Line Speeds

containers, at timed intervals, and with no drip loss

curately controlled by a pressure regulator and an air chamber. Both the pump and pressure regulator were specially designed for this application. uniformity of pressure is critical since the amount of solution dispensed is regulated by accurately timing the spray interval.

As in much high-quality food equipment, all contact parts are of stainless steel or inert plastic tubing. Magnuson Engineers, San Jose, Calif., who designed and now manufacture this dispenser for International Minerals & Chemical Corp., borrowed from the medical profession some of the parts used in its design.

The completely inert plastic tubing is that used for intravenous injections. To obtain a stream or spray nozzle with uniform characteristics, the engineering company modified the conventional hypodermic needle.

At Patterson Frozen Foods the dispenser is installed, in line, beside the carton filler. The flexible plastic tubing and the vertical-horizontal adjustment bars serve to permit location of the spray-head properly over the filler. Empty cartons move into the filler from a conveyor belt. They trip a special waterproof mercury switch (located just before the spray-head on the filler) that actuates the 10v. electric circuit to the timer and deflector solenoid.

Operating Details

Frequency of filling and also "no-carton no-fill" control are regulated by this circuit. Precise amount of solution dispensed to the packages is easily adjusted by the timer control knob. The machine will also dispense into open containers moving along any simple straight conveyor.

The spray-head is comprised of a miniature nozzle, a solenoid-operated deflector, and a basin that drains through plastic tubing to the supply reservoir. In operation, the solution is sprayed continuously from the nozzle, either as a stream or fan spray. When not spraying into a package, the solution is deflected to the basin and returns to the reservoir to be recirculated through the system.

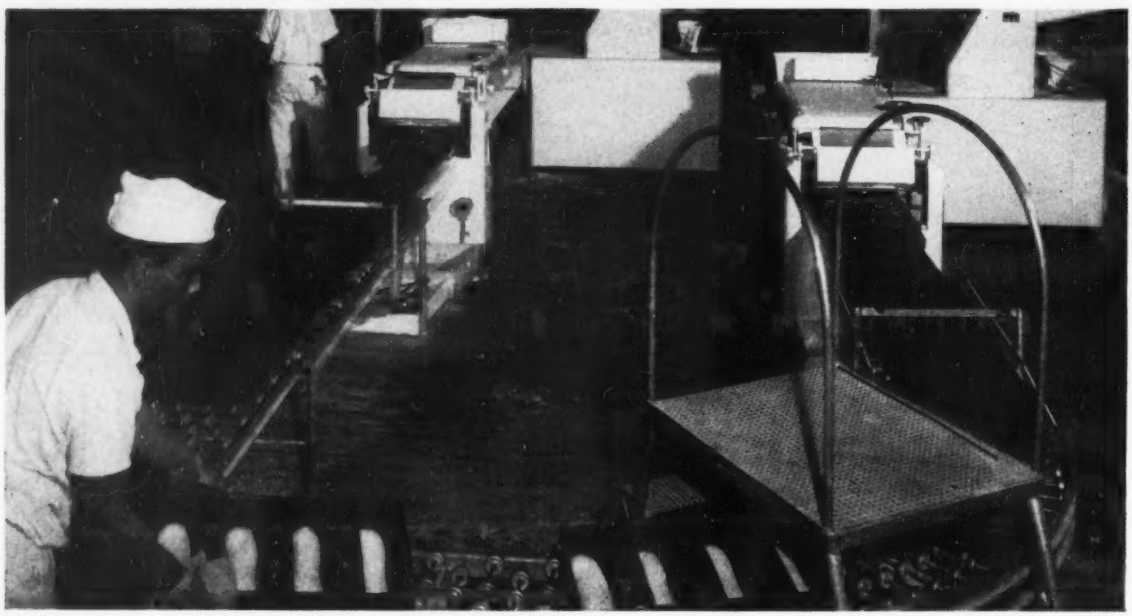
When a package actuates the mercury switch, the deflector moves out of the stream and allows the solution to spray over the contents of the package. After a short, precisely measured time interval, the timer automatically interrupts the electrical circuit and the stream is again deflected into the basin.

Split-Second Timing

It is the length of the time interval that precisely regulates the amount of solution dispensed in each shot. The spray interval may be adjusted from .05 sec. to as long as 2 sec. Various nozzle sizes are available for adjusting the dispensed amount over a wide range.

SCALING is "out," now that fungal enzymes go in sponge dough in tablet form, along with other ingredients. P. Biondillo, assistant production manager shows how.

MIXING is easier following addition of concentrated enzyme tablets. And dough develops and hydrates better. Author checks dough elasticity and hydration.



DOUGH handles easier as it goes through automatic divider, rounder, and molder. Head rollers on molders can be set to maximum tightness so that a thinner dough is sheeted without tearing.

New Enzyme Tablets

Benefit Both Product and Process

Using "fungals" in this convenient form, bakers now control bread quality easily and accurately—and with better dough development, mixing, machining

DAYUL W. DONALDSON
Production Manager, Holsum Sunbeam Bakeries, Inc., New Orleans

Standardized fungal enzymes—amylase (diastase) and protease—now are available in concentrated tablet forms to provide the baker with a handy, versatile tool for controlling quality and uniformity of the breads.

There are other benefits, too: As a result of more accurate supplementation of enzyme requirements, better hydration and development of doughs are assured. Mixing and machining of doughs are easier. Gas formation and bread-toasting qualities are improved. Errors in weighing are entirely eliminated, and storage space requirements are minimized.

Supplied to bakers under the trade

name "Twin Zyme" (by Food Industries Co., Dallas, Tex.), these tablets are easily dissolved in water, which is then added along with other ingredients to sponge dough.

What They Do

Diastase—a general term for a system of enzymes—contains alpha amylase, which is of particular importance to the baker, since most bread flours are deficient in it. Alpha-amylase is beneficial in bread production. It modifies or converts some of the wheat starch into dextrins and fermentable sugars, which produce a more vigorous yeast fermentation and often improve the crumb structure and crust color of bread.

Protease (proteolytic) enzymes soften or mellow the gluten (wheat proteins) in dough so that it mixes easier and quicker. The dough then becomes more pliable, and it goes through automatic make-up machines better and without tearing. Further,

(Turn to page 167)

NUMBER of Amylase and Protease Tablets Required for Varying Amounts of Flour in Dough Formulas

	300 lb. Flour		500 lb. Flour		600 lb. Flour		900 lb. Flour	
	Amylase	Protease	Amylase	Protease	Amylase	Protease	Amylase	Protease
1st Dough'.	6	0	10	0	12	0	18	0
2nd Dough.	5	1	8	2	10	2	15	3
3rd Dough.	4	2	6	4	8	4	12	6
4th Dough.	3	3	4	6	6	6	9	9
5th Dough.	2	4	2	8	4	8	6	12
6th Dough.	1	5	0	10	2	10	3	15
7th Dough.	0	6	..	..	0	12	0	18

● ● ●

LETTERS TO THE EDITOR

What FDA Inspectors Cannot Do in Food Plant

Editor, FOOD ENGINEERING:

Mr. Holmes' article, "How FDA Men Inspect a Plant," is an interesting survey of a government inspection of a food plant. The article (FE, Nov. '53, p. 64) properly laid stress on the beneficent work of the Food & Drug Administration, which merits paeans of praise, both from the American consumer and from the American food manufacturer, for its outstanding work performed with a rare integrity.

Mr. Holmes states that he is interested "in how the food plant operator is affected by enforcement of the sanitation provisions" of the 1938 Food, Drug & Cosmetic Act. If such were his goal, then he should have pointed out *all* the safeguards . . . which Congress accorded to the food manufacturer under the 1953 amendments to the basic food and drug law. The new protections to the manufacturer can be summarized briefly as follows:

1. Upon completion of an inspection and prior to leaving the premises, the officer or employee making the inspection is to leave a report in writing setting forth any conditions which in his judgment indicate filth or unsanitary conditions.

2. If a sample is obtained during the course of an inspection, then prior to leaving, the officer or employee must leave a receipt therefor. If an analysis is subsequently made of such sample to ascertain whether such foods consist in whole or part of any filthy, putrid, or decomposed substance or is otherwise unfit for food, a copy of the results of such analysis must be promptly made available to the food plant operator.

3. In case of a condemnation proceeding, there is available to the food plant operator a true copy of the analysis on which the proceeding is based, and the identifying marks or numbers, if any, of the packages from which the samples analyzed were obtained.

Mr. Holmes, at four different places in his text, has noted that the food and drug man will take photographs of various conditions in the plant which "are invaluable as evidence in any actions taken against the company and its products." Food & Drug inspectors may have instructions from their superiors to take photographs of a food plant, but Mr. Holmes should have advised his readers that there is a serious legal question as to the right of the Food and Drug men to take photographs as part of an inspection.

The Commissioner of Food & Drugs, in his testimony before the House Committee on Interstate & Foreign Commerce, has noted that he knows of no specific authority in the statute to take photographs. The counsel for the National Canners Assn. has advised the members of his group not to permit the taking of photographs as part of any inspection by the Food & Drug men.

The writer of this letter, after an extensive study of this problem, which will be published in article form, does not believe that there is any statutory authority for the taking of photographs under the Food & Drug Law, nor does the writer know of any court that has sustained the right of F&DA to take photographs as part of an inspection routine over the objections of the food plant operator.

In the cases that have arisen [e. g.,

(Turn to page 166)

Author Takes Exceptions To Critical Comments

Editor, FOOD ENGINEERING:

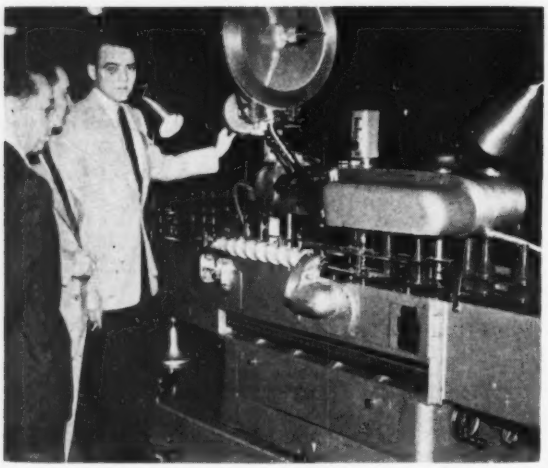
There is a great deal of value in Mr. Winston's comments [item at left]. However, I should like to point out that the article in question was written prior to final passage of the 1953 amendment to the law. Hence, that was not made a serious section of the article. An additional article commenting upon this has been planned.

Quite frankly, Mr. Winston's letter in some measure perturbs the writer. In his experience as a food industry sanitation consultant over a good many years, the writer has yet to encounter an incident where the Food & Drug Administration has performed a gross injustice, meriting the type of restricting activities which Mr. Winston is more or less hinting at. By this is meant the concept of forcibly preventing the taking of photographs of obvious conditions, and whether or not to take refuge in the corporate status of the company under the Fourth Amendment.

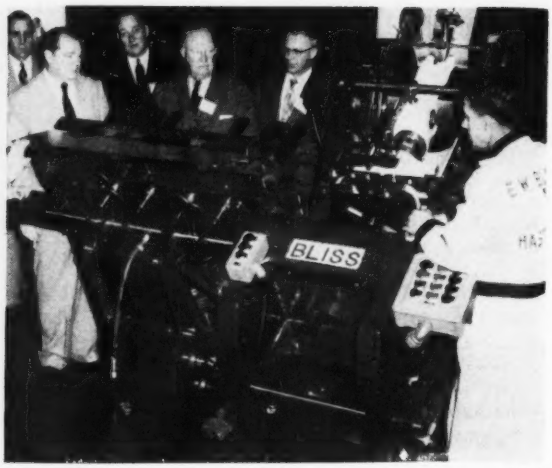
These are matters, of course, which it is up to the legal profession and the courts to thresh out. However, as a sanitation consultant, the writer believes that it is quite possible for a food manufacturer to go along with the fundamental ideas of F&DA, and the professional sanitation consulting field generally, and avoid any difficulty with regulatory agencies.

All of the writer's published material, over the last six years, has been directed at this thesis—which might be termed "preventive sanitation." In other words, first learn what is required, then clean up and actually

(Turn to page 167)



CATSUP discoloration and cap corrosion are minimized with new Duraseal catsup caps shown here being applied by Steriseal sealing machine.—**Anchor Hocking Glass Corp.,** Lancaster, Ohio. (60A)

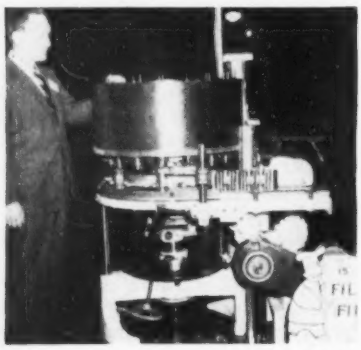


SANITARY can ends and closures are produced at high speeds by newly designed strip-feed press operating at 300 strokes per min. Has many advanced features.—E. W. Bliss Co., New York City. (60B)

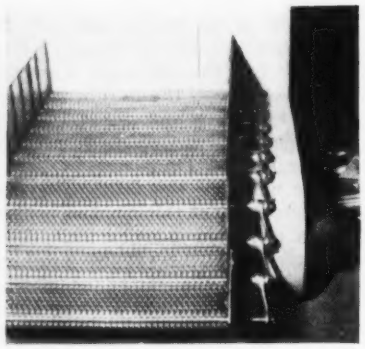
LABELS are applied to square, rectangular, or oval bottles in sizes from 4-oz. to 1-gal. at speeds up to 120 per min. and held under flexible compression units to insure firm seal in new Thrifty labeler.—Package Machinery Co., Springfield, Mass. (60C)

NEW UNITS Attract Canners

At Atlantic City, they see improved processing equipment, higher-speed fillers, new glue labelers . . . Greater attention to sanitary construction wins praise

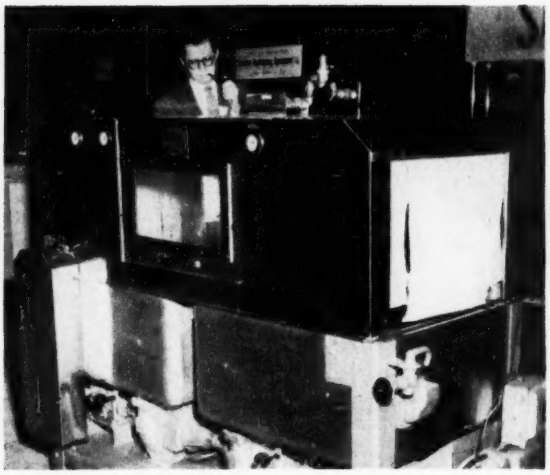


OVERFLOW filling principle provides extreme accuracy and uniformity at high speeds with brines, syrups, and juices on 15-valve Fil-Mor unit.—Food Machinery & Chemical Corporation, San Jose, Calif. (60D)

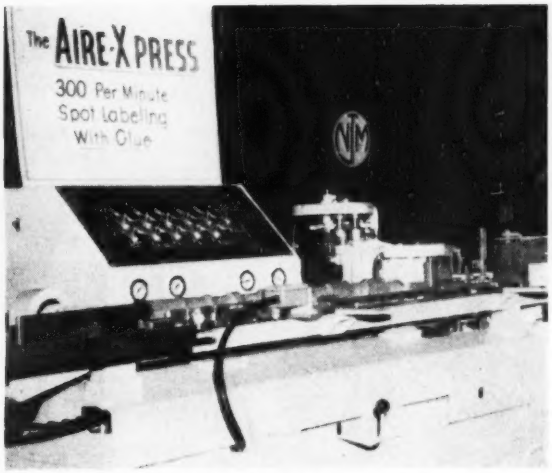


WEAR on woven-wire conveyors is minimized by free wire member inserted before and after each support rod to reduce strain as belt rounds pulleys.—Cambridge Wire Cloth Co., Cambridge, Md. (60E)

DENTED rims of cans are completely straightened at high speeds, and without damage to bead or inner liner, by Fox can straightener. Takes any size can. — Chisholm-Ryder Co., Niagara Falls, N. Y. (60F)

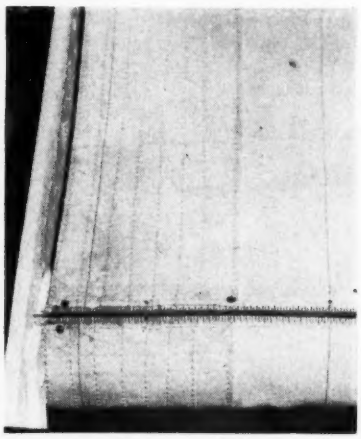


MEAT pans, lug boxes, and similar receptacles, are cleaned at up to 190 per hr. in Insinger washer. Pans get hot detergent, hot water sprays, then final steaming.—Sinclair-Scott Co., Philadelphia. (61A)

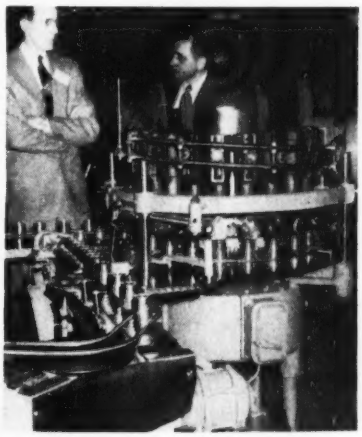


APPLICATION of spot labels with conventional liquid adhesives in straight-line operation at speeds up to 300 per min. are features of Aire-Express labeler shown by New Jersey Machine Corp., Hoboken, N. J. (61B)

PORTABLE circulating unit for CIP pipelines comprises 50-gal. solution tank with automatic temperature control, circulating pump.—Cherry-Burrell Corp., Chicago. (61C)

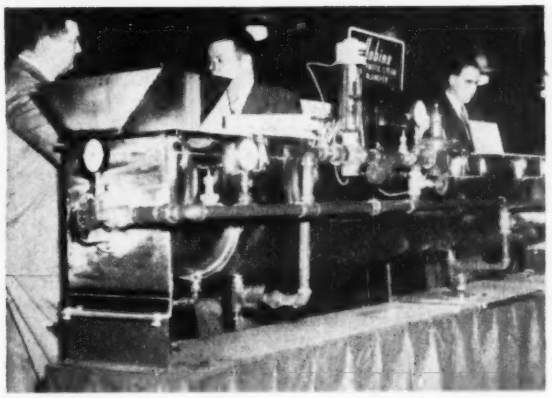


QUICK-CHANGE split-type viner apron employing new and improved lacing that facilitates insertion of splicing wire.—Berry Canvas Goods, Inc., Philadelphia. (61D)



CANS (6-oz.) are filled 550/min. on RP-21 unit. Features 316 stainless contact parts, quick demountable valve assemblies.—The Pfaudler Co., Rochester, N. Y. (61E)

REDUCTION in labor and improved quality due to delivery of fresher peas and lima beans to cannery are outstanding advantages claimed for portable viner shown by The Scott Viner Co., Columbus, Ohio. (61F)



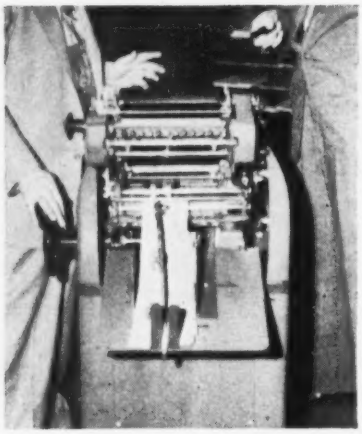
SANITARY construction of worm and blanching chamber, also uniform application of live steam to products as they move through unit, are features of Thermotic mushroom blancher exhibited by A. K. Robins & Co., Baltimore. (61G)

Want more information about any items in this picture article? Just circle the key number (end of each caption) on Reader Service coupon on page 179.

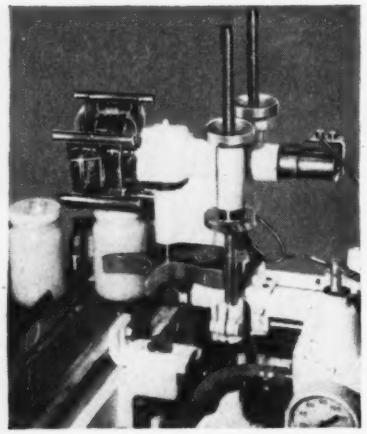
"Show Tour" Continues→

HOW slight variations in product temperature in Votator heat exchanger cause Transet control system to respond instantaneously was shown at booth of Taylor Instrument Co.'s., Rochester. (62A)

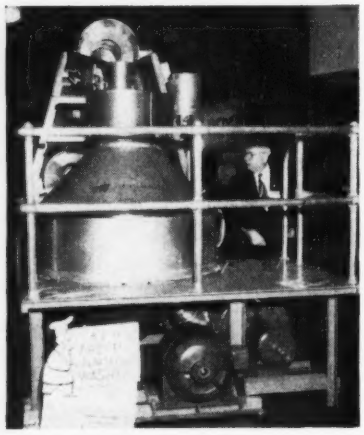
VISCOSITY of catsup is continuously measured by Brookfield viscometer and charted by Dynalog recorder at booth of The Foxboro Co., Foxboro, Mass. System also applicable to malt syrup, honey, molasses. (62B)



CAN LABELS are automatically imprinted at high speeds with Multigraph Model 250—Addressograph-Multigraph Corp., Cleveland. (62C)

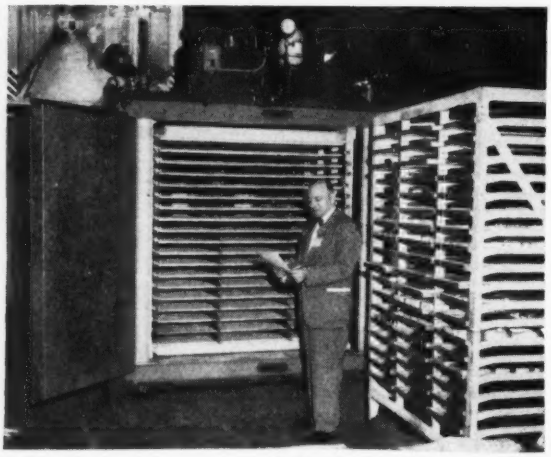


DETECTOR checks sealed jars for vacuum, hydraulically ejects defective ones from line.—Crown Cork & Seal Co., Baltimore. (62D)



PEAS and lima beans are separated from hulls, etc. by wetability in Key grader shown by Food Mach'y & Chem. Corp., San Jose, Calif. (62E)

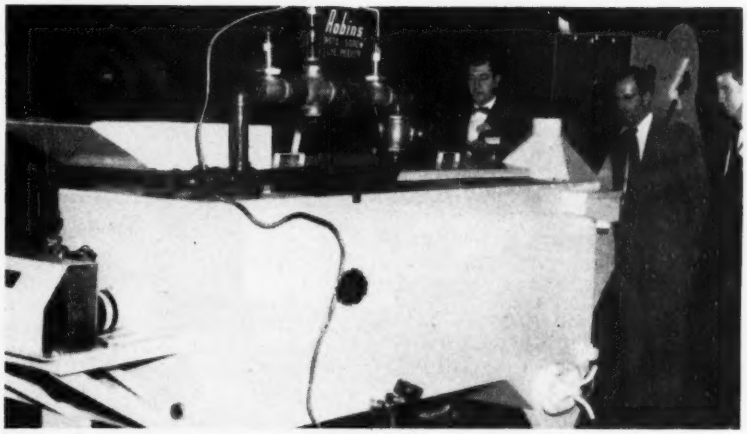
HIGH SPEED, fully automatic sealing of wide range of case sizes is feature of compact Packomatic case sealer. New method of application saves glue, speeds drying.—J. L. Ferguson Co., Joliet, Ill. (62F)



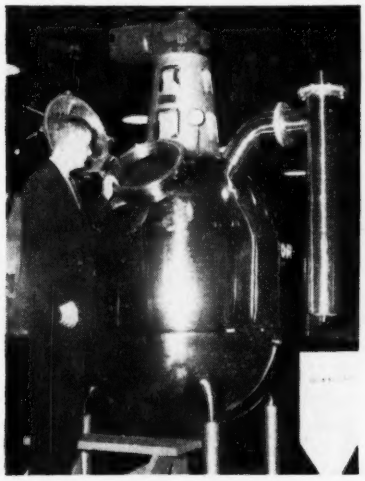
FASTER freezing, greater efficiency result from positive contact of plates with top and bottom of packages in improved unit.—Amerio Contact Plate Freezers, Inc., Union City, N. J. (62G)

Preparing, Cooking, Retorting

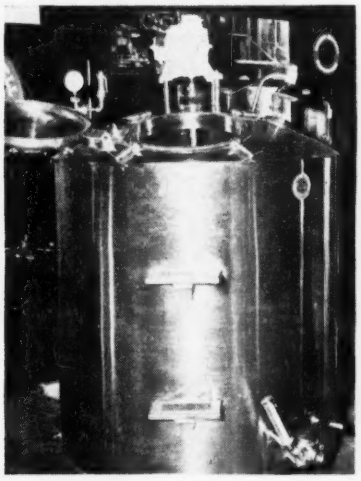
VEGETABLES are diced at high speed, chips minimized, with Model F Dicer.—Urschel Laboratories, Inc., Valparaiso, Ind. (63A)



LYE PEELER for root vegetables gives high capacity with uniform treatment in small space by means of Roto-Screw that forces products down under lye solution. Elevator discharge permits products to be fed directly to final washer.—A. K. Robins & Co., Baltimore. (63B)

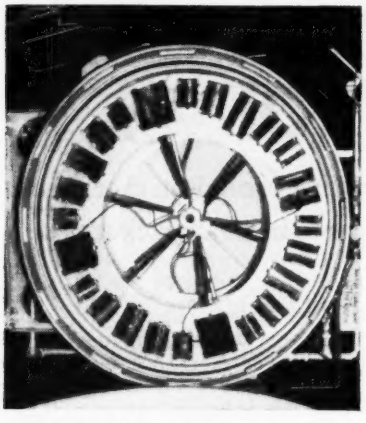


TOMATO paste and similar products may be cooked under vacuum with agitation in new stainless vacuum mix-cooker displayed by Hamilton Copper & Brass Wks., Cincinnati. (63C)

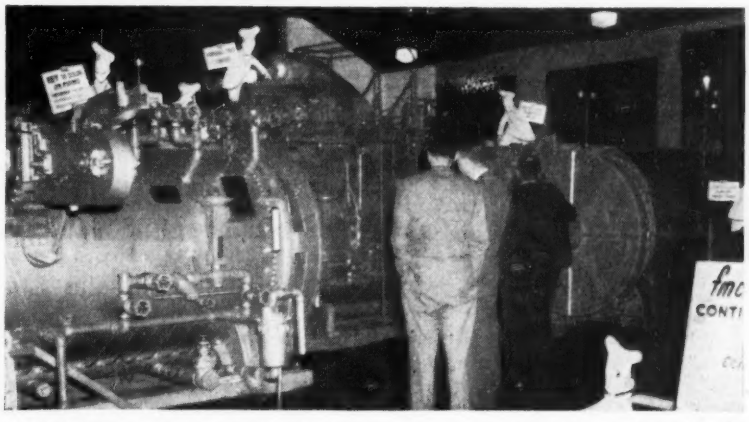


TEMPERATURES up to 250 F. are quickly attained in 300-gal. stainless pressure cooker featuring zone heating for variable size batches.—Cherry-Burrell Corp., Chicago. (63D)

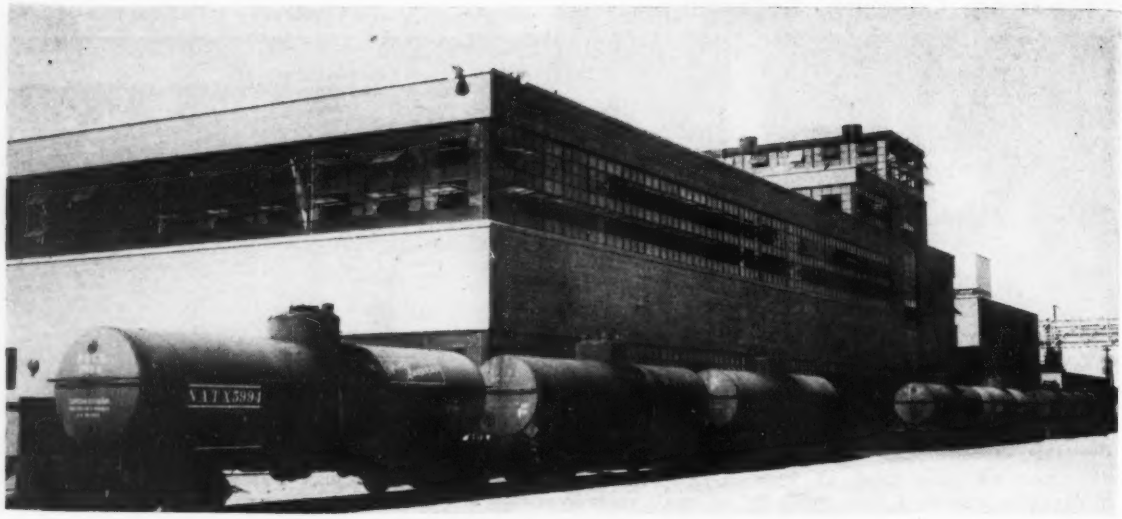
SANITARY construction, 2-min. take-down time for cleaning, uniform particle size, and continuous flow feature angle disintegrator.—Rietz Mfg. Co., San Francisco. (63E)



END-OVER-END principle of Agi-Tort sterilizer-cooker and cooler is demonstrated with laboratory unit.—Chain Belt Co., Milwaukee. (63F)



COMPLETE, full-size Sterilmatic continuous pressure cooker and cooler for short-time, high-temperature sterilization of canned foods, also models illustrating heat penetration and agitation within unit, were displayed by Food Mach'y & Chem. Corp., San Jose, Calif. (63G)



Carload to . . .

. . . Container

QUALITY CONTROL

Careful rein on mammoth vegetable-oil throughput by lab-process liaison checks errors before they can become serious, builds high standards in small packages

FE STAFF

Any plant that routes twelve tank-car loads of raw material through a processing plant daily needs a strong accent on control—if it's going to maintain a record of superior product with least waste.

And, when that raw material is vegetable oil—720,000 lb. to be converted to technically delicate shortening, margarine, and salad oil—then there had better be "an extra emphasis on the accent."

That "extra" is what they apply at the new Jacksonville, Ill., plant of Mrs. Tucker's Products (Division of Anderson, Clayton & Co.). And it pays back handsomely in terms of steady and diversified production of first-quality vegetable oil products.

Specifically credited for this company's rarely-troubled routine are factors of long experience and constant improvements in techniques, along with comprehensive Standard Operating Methods (S. O. M.).

A rather unique cog in this program is a post devoted to the actual policing of S. O. M. in quality control and

processing—the job of quality supervisor. Technically, the quality supervisor acts as head of the Laboratories. But, in fact, he spends 80 to 90% of his time out in the plant assuring that laboratory standards are maintained in epic scale.

Hence this article will describe the scope of this lab-process liaison work and tell how it contributes to trouble-free, quality production at the Jacksonville plant.

But before launching into the *modus-operandi* of quality supervision it is pertinent to consider the training leading to Mr. Budlong's assumption of this post in the new Jacksonville plant. For this will help round out the perspectives.

Training Program

Behind the neophyte supervisor there usually stands a degree in chemistry or chemical engineering. Quality Supervisor Budlong received his B.S. in Ch. E. from Oklahoma University. This led to joining the company in Sherman to enroll in its two-year technical training program.

During training a full year is spent in the company laboratories, mostly in the control lab. Bulk of the remaining time is put in out in the plant learning to operate the various processes, such as bleaching, refining, deodorization, hydrogenation, and hydrogen manufacture.

FOR A DETAILED LOOK into Mrs. Tucker's huge new plant and its processes see this month's FE Picture-Flow-sheet, "Edible-Oil Processing—'Raw to Package.'" It's on pages 140-143.

In addition to this basic production training, a short time goes to familiarization with office routine, including cost accounting, personnel, and drafting Standard Operating Methods and specifications.

Finally, a highly significant two weeks are spent with salesmen in the Products Service Department to get the "feel" of customer relations and learn the performance of the many specialized shortenings.

On completion of basic training, Mr. Budlong was officially assigned as a project engineer with Technical Division. Time here was spent in actual work on various research and development problems under supervision of a senior engineer.

And then came the company's decision to build the Jacksonville plant. Thereupon, his full time was allocated to the design crew—with a physical move a year-and-a-half later to Jacksonville as a construction engineer.

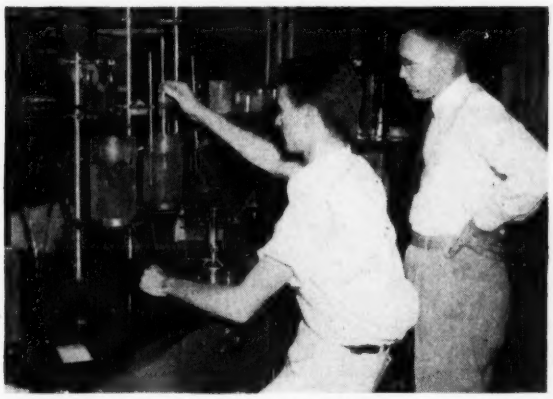
Hence, when the plant was approaching operation in 1952 the construction assignment was re-oriented to the job of setting up the three quality control laboratories. And when the plant went "on-stream" this evolved to the title and function of quality supervisor for Mr. Budlong.

Quality "Watchdogs"

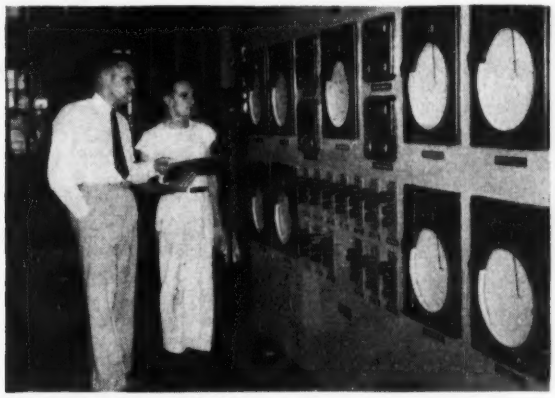
Since the official "supervisory" aspect of the quality supervisor is to oversee and work with the three laboratories, let us first consider the structure and scope of these groups:

Essentially, each lab functions as a "watchdog" over a phase of plant manufacture—concerned with various departments and products as follows—

I—Refining & Bleaching Laboratory
(5 analysts)



A LEARNING iodine value is deviating on a specific lot of shortening. Quality Supervisor Budlong has technician make extra-critical determination of Wiley melting point. This shows value is minutely changing.



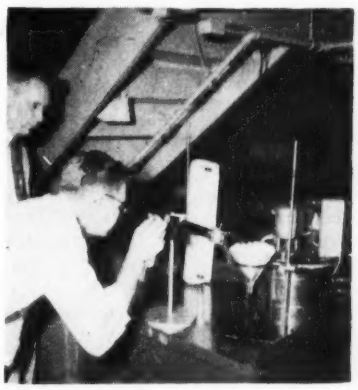
B CAREFUL CHECKING routine follows. Here, survey with process supervisor at hydrogenation control panel indicates all instruments are functioning in calibration. Search for "deviator" continues.

CASE HISTORY: How Quality Supervisor "Tracks It Down"

All-important to the user of shortening are the melting characteristics of the product—properties largely determined by the hydrogenation process.

For example, one big customer of Mrs. Tucker's called for shortening with a certain Wiley melting point coupled with a prescribed iodine value. Then during the lot run, routine tests by the Process Control Laboratory indicated the I. V. was creeping up out of standard—a deviation which would precede a bold change in the Wiley.

This situation was reported to Quality Supervisor Budlong—who went into action as shown here.



C FINALLY, analysis puts accusing finger on the catalyst. Quickly it's changed. Then end-point refractive index check on next batch shows iodine value dropping back "into line" . . . And Mr. B. is off on the next job.

A. Incoming crude cotton or soybean oil
B. Refining
C. Bleaching
D. Outgoing cottonseed or soybean soapstock from refining

II—Process Control Laboratory (12 analysts, 1 foreman)
A. Hydrogenation
B. Post hydrogenation bleaching
C. Winterization (manufacture of salad oil)
D. Deodorization
E. Hydrogen gas manufacture
F. Outgoing tank car shipments of processed oil
G. Utilities (i.e.—steam generation, cooling towers, water, etc.)

III—Finished Products Laboratory (3 analysts, chief chemist as over all foreman)
A. Bulk and case shortening
B. Bulk and case salad oil
C. Margarine

As outlined, the function of the Refining & Bleaching Laboratory is to check the crude cotton or soybean oil coming into the plant for quality and grade. The seed oil producer is paid on basis of this lab's analysis. Also, the lab offers routine survey of refining efficiency and refined oil quality by checking refined oil samples for bleach, free fatty acids, moisture content, and color.

Bleaching department performance is indicated by tests on incoming and outgoing oil. Primary is to note that color has been sufficiently reduced to meet quality limits set up for the next processing step—but free fatty acids and moisture are also checked to be sure that nothing is being done which might impair subsequent quality.

Heart of Control

Largest and busiest is the Process Control Laboratory, which might be considered as the true heart of the control program.

Among the many vital items it checks as routine are hydrogenation end-points, deodorized oil flavors and odors, post-bleaching colors, and cold test of winterized salad oil. In addition it keeps track of scores of tests on boiler water at different stages of its softening, process water, and water from the two cooling towers.

Since many variables can influence performance in the rather complex processes covered by this laboratory, the above routine tests on product to-and-fro acts as an excellent trouble-spotter. Hence, what sometimes appears as unnecessarily tedious routine may deter much more burdensome and costly in-plant mistakes.

To cite an example of routine, a batch of oil to be deodorized (usually one tank car lot or 60,000 lb) must be checked pre- and post-deodorization for Wiley Melting Point, percent solids at various temperatures, free fatty acid, peroxide number and flavor (post-deodorization only), impurities, moisture, green color, and congeal point.

Armed with the above data the quality supervisor, familiar with process technology, can quickly trace any plant locale at fault.

The Finished Products Laboratory is responsible for all of various tests to determine quality in the final product. Here, for example, shortening is tested for plasticity, air content, color, free fatty acids, peroxide number, shelf life by aging tests, etc. This laboratory is also responsible for surveillance of finished margarine, plus checks on quality of all its ingredients.

As part of his duties, the man in charge of this laboratory conducts weekly warehouse inspections to eliminate over-age stock from storage.

Also, he is responsible for workings of an oil-and-margarine flavor panel that convenes twice daily.

While the above discussion conveys

(*Turn to page 165*)

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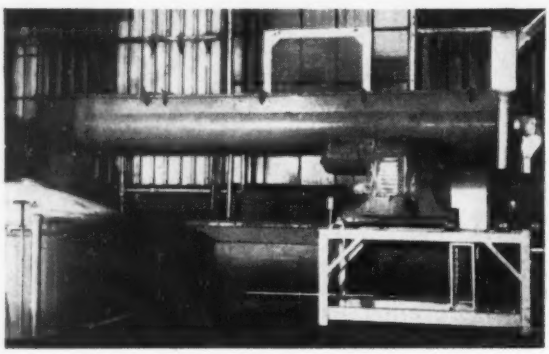
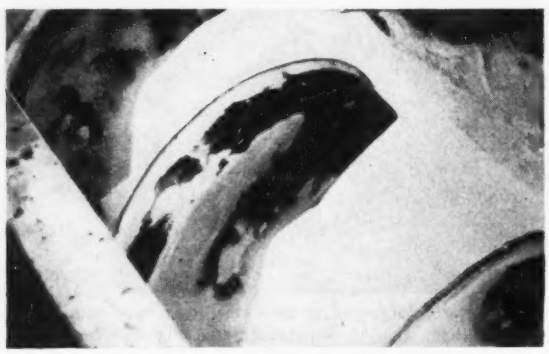


Water-cooled screw conveyors . . .



. . . banish heat from granules, thus—

Taking "Cake" Out of Sugar

GRANULATED sugar that's stored in bulk immediately after refining tends to cake, so is hard to handle.

But this caking problem has now been eliminated at the Holly Sugar Corp. Alvarado, Calif., plant through the use of water-cooled screw conveyors as a cooling medium.

It was found that if the warm, newly-refined sugar was cooled before storage, it would not cake.

Accordingly, two Rietz Model TJ Thermascrews were installed, one above the other, between the sugar conveyors and the 150,000-lb. storage bin. These units are continuous, screw-type conveyors, each equipped with a hollow shaft and screw mounted inside a jacketed trough.

Use of two units, rather than one, gives added capacity to the system. Sugar is conveyed directly from the dryer through a Y-tube to the two Thermascrews.

Water at 20 deg. C. (68 deg. F.) is circulated through the hollow shaft, screw, and jacket. Coming in contact with both jacket and screw, sugar conveyed through the unit drops in temperature from 54 deg. C. to 35 deg. C. (129 to 95 F.) This process does not cause any apparent crystal abrasion.

Rate: Approximately 6 tons of sugar per hour are currently cooled at the plant by this method.

"Good Maintenance . . . keeps down unit cost of your products." Speaker is McGraw-Hill's L. C. Morrow. Beside him is National Biscuit's G. J. Martin.

- **Seat yourself in this audience** ☛
- **Pull out your pencil**
- **And take down these lucid plant-practice tips of 10 speakers on today's . . .**

MAINTENANCE "KNOW-HOW"

With mechanization continuing to climb in your plant, proper methods of evaluating, installing, and operating an efficient maintenance program rate your No. 1 attention. For they can pay off in higher production, reduced downtime, lower costs, better sanitation, and improved employee relations and morale

By carefully considering the why, what, when, and how of planning and scheduling your maintenance work—and then "accenting the positive" in putting the techniques into practice—the efficiency of your food plant operations will be augmented all along the line.

This was the theme stressed in cogent talks at the 5th National Plant Maintenance & Engineering Show & Conference recently held in Chicago.

Topics particularly highlighted by leading engineers were methods used, how work is handled in various-size plants, benefits to be gained, inspections, lubrication, the role of sanitation, union and management views, problems in corrosion.

"Maintenance has much to do with the incomes of productive workers whenever their pay depends on productive output. It is only when production equipment can be run at maximum capacity that the productive workers can earn maximum pay" stated Conference Chairman L. C. Morrow, consulting editor of *Factory Management & Maintenance*, McGraw-Hill Publishing Co., in keynoting the sessions.

"Good maintenance," he continued, "keeps down the costs of accidents to personnel and equipment, and that means it keeps down unit cost of your products.

"High speed means more production, but it also means more wear on equipment, intensified lubrication problems, more costly auxiliary equipment and higher cost of downtime."

Mr. Morrow further stated that "control systems require high grade engineering talent for their maintenance. The more nearly the plant approaches complete automaticity, the more complex becomes the control mechanism, and the higher the cost of downtime.

Maximum Benefits Gained

Planning and scheduling was the topic of George J. Martin, manager, Mechanical Div., Production Dept., National Biscuit Co., New York City. He declared that only proper planning and scheduling of maintenance work

could gain the maximum preventive benefits—reduced downtime, increased production, lower labor costs. Placing of work on a regular schedule would, he said, eliminate 10 to 15% of maintenance labor costs through savings in normal and overtime labor.

Martin continued: "It has frequently been said that all maintenance work can be scheduled. Others feel that only a small percentage can be done on a planned basis. The latter is true only in plants that have not installed modern preventive maintenance procedures. Where planning and scheduling procedures have been installed they have found that 80 to 90% of all maintenance work can be properly planned and scheduled."

He also stated that although a maintenance organization may have capable mechanics and ample supervision, nevertheless, "without good planning and scheduling, it cannot achieve maintenance operations on a low cost efficient basis."

And he said further: "Anything that reduces maintenance efficiency invariably increases depreciation and production costs. Plant production methods cannot be termed modern if the equipment is serviced by out-of-date methods. A well organized and efficiently operated maintenance department pays big dividends in any industry."

Where Personnel Numbers 150

Planning and scheduling maintenance in a plant of 150 employees was discussed by Clark A. Ralph, plant engineer, Wales-Scrippit Corp., North Tonawanda, N. Y. Ralph explained that before any planning or scheduling is started at his plant a request must be made for work to be done. Coming from the shop or the clerk who handles the preventive maintenance records, the request is broken into two categories: (1) Machine repair and adjustment, (2) building repair and maintenance.

For the first group, the request will originate with one of the following: Foreman of department, safety committee, quality control, superintendent, tools and methods men, or plant engineer. Those from the second group originate with: superintendent, plant manager, plant engineer or safety committee.

All request forms go to the plant engineer's office for processing. In the first group the request must be approved by the superintendent and department foremen. This approval alerts all concerned with the conditions so that safety measures can be taken and plans made to get the production work done as required without use of the equipment in question.

Maintenance request cards are placed on a board. Every Thursday all cards are pulled that have a flag for the next week or period, and the work orders are written for the following week. Orders are then posted on the board in conjunction with repair tickets.

Machine or equipment cards are employed. These become the "bible" of the equipment as far as history and maintenance is concerned. The machine card tells the following:

1. What machines are in need of replacement because of large repair costs.
2. If machine is properly serviced.
3. If certain types of failures are repeating so corrections or alterations can be made or special attention given to problem.
4. If more frequent overhauls are necessary.
5. When too much time is lost due to repetition of same type of breakdowns. Here, a card provides the engineer with a sound footing to face management and demand a complete shutdown for proper repairs.
6. Whether special action must be taken to obtain new parts—even to extent of making up new parts at extra cost to stop repeated, short-time shutdowns.
7. When new machine is needed because of service costs.

What Happens in Larger Shop

How maintenance work is handled in a plant with 1,100 employees in the shop was covered by F. R. Malmgren, building superintendent, A. B. Dick Co., Chicago. The planning in this company is done by several members of the supervisory staff who are in charge of various types of maintenance. In this organization, both the master mechanic and the building superintendent report to the director of manufacturing (works manager).

Reason for this set-up is size of the plant, which requires the full attention of the master mechanic (on production problems) and the building superintendent (on buildings, grounds, and plant services). The maintenance manager, who is in charge of most mechanics, reports to the master mechanic, since the majority of maintenance hours worked is on production machines and equipment. His office force consists of a dispatcher and clerk.

Said Malmgren: "Ideal arrangement on production machinery would be a system allowing service on each piece of equipment at a stipulated time. This is seen working well in plants where there are many machines of the same type and one machine off the line would not affect production. But where we have only a limited number of machines of a particular type, we must schedule maintenance according to production requirements. And unless a serious fault is apparent, the machine must be serviced when it can be spared from production."

At Malmgren's plant, the chief operating engineer, who is in charge of the boiler house and air conditioning equipment, schedules his own maintenance work. He operates on a budget covering all labor, material, fuel, and

(Turn to page 237)

They Packed the Place

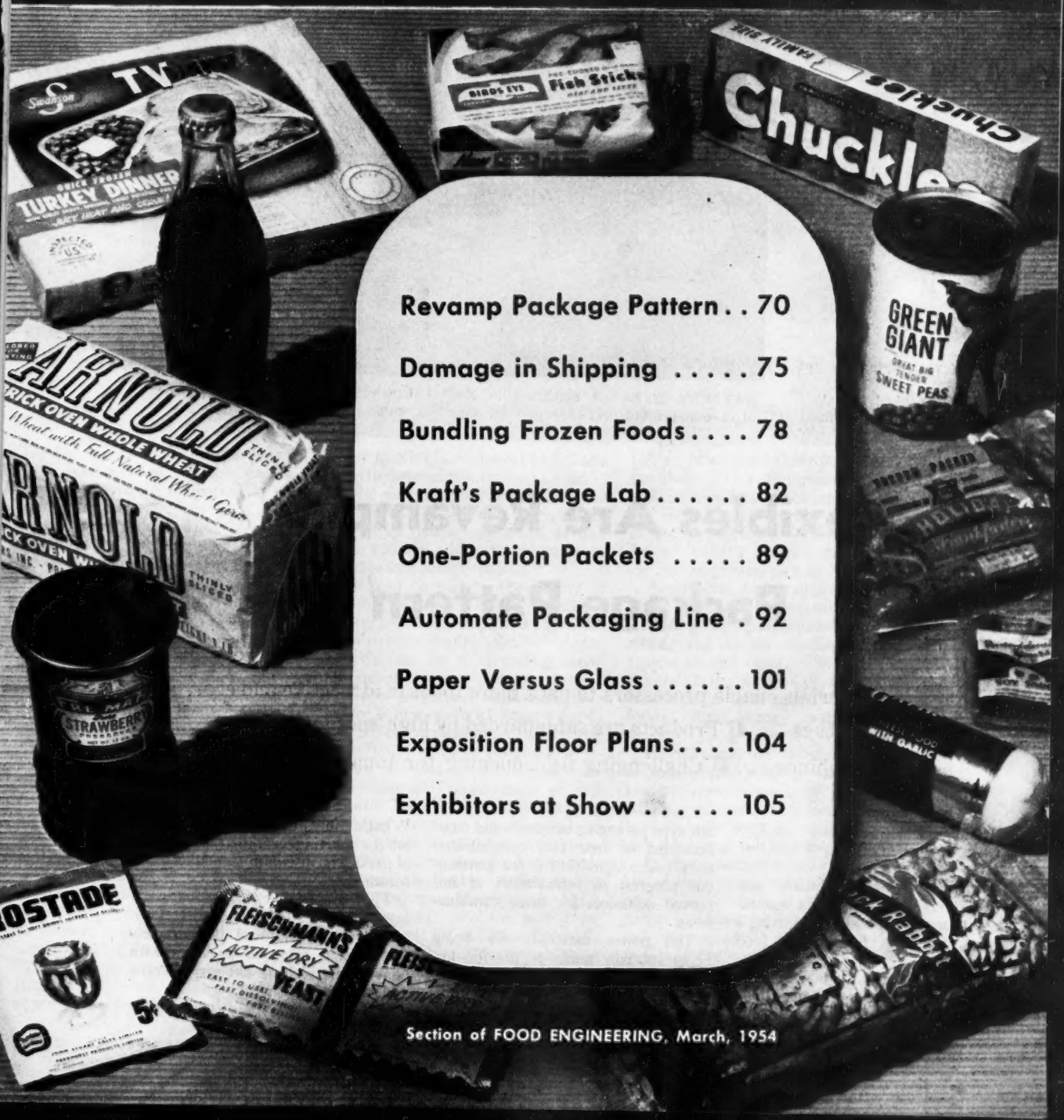
Huge and active attendance at the 5th National Maintenance & Engineering Show & Conference, held in Chicago, indicates the rapid growth and increased importance of maintenance operations in today's plant picture.

At the opening session, a record crowd of 2,300 engineers, production, maintenance, and sanitation executives filled to capacity the Hilton's Grand Ball Room. Total registration exceeded 6,500. In conjunction with 20 various conferences, 400 exhibitors displayed more than 5,000 machines and products on the Amphitheatre floor, where attendance exceeded 20,000.

Food Engineering's

PACKAGING SPECIAL

★ AND SHOW GUIDE ★



Revamp Package Pattern . . 70

Damage in Shipping 75

Bundling Frozen Foods 78

Kraft's Package Lab 82

One-Portion Packets 89

Automate Packaging Line . 92

Paper Versus Glass 101

Exposition Floor Plans 104

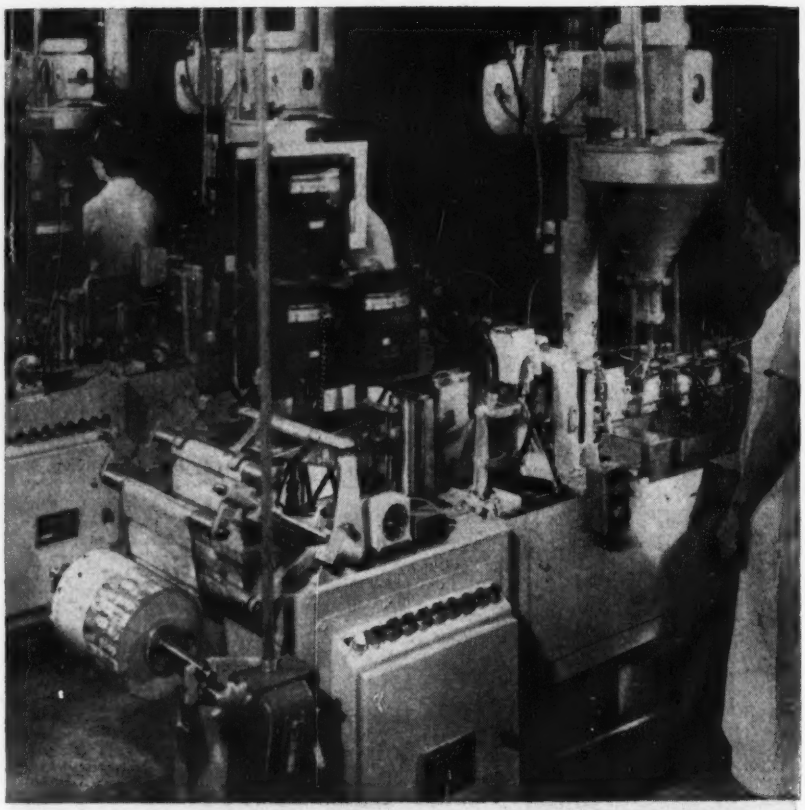
Exhibitors at Show 105

Section of FOOD ENGINEERING, March, 1954

POPCORN and shortening in twin poly-cello pouch.

MILK SOLIDS put up in laminated sealed foil pouch.

TOPPINGS packed in poly cello pouch with tear device.



BATTERY of Bartelt machines at F&F Laboratories, Chicago, form pouches of reverse-printed poly-cello and fill with 3-oz. sundae topping, 60 a min.

Flexibles Are Revamping Package Pattern

¶ New materials enable processors to pack more foods in attractive and economical pouches . . . ¶ Products are safeguarded by high-speed vac and gas-packing machines . . . ¶ Challenging field opening for tomorrow's packers

JOHN V. ZIEMBA
Associate Editor, "Food Engineering"

Four factors—new materials, machines, and techniques, plus mounting consumer acceptace—are spurring a growing trend to flexible-type food packaging.

There's brisk activity in suppliers' research labs and pilot plants that's focused on development of new flexible-type packaging materials and combinations of new and conventional ones. Also significant is the continuous progress in formulation of improved adhesives for these combinations.

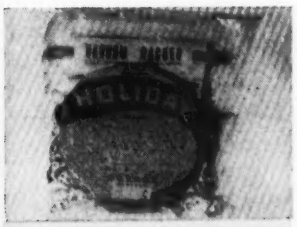
The newer materials are being being specially made to provide improved functional properties—heat-sealing, liquid-holding, gas- or vacuum-retaining, and delamination-resisting. What's more, they're doing a better job in meeting ever-increasing needs of packagers, distributors, retailers, and consumers.

They are enabling the food packagers to enjoy a host of advantages:

1. Greatly improved product protection—and often in packages with convenience features like easy opening and dispensing devices.

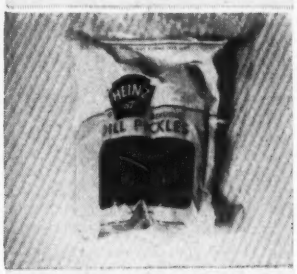
2. Compactness plus light weight

8-HEAD ROTARY UNIT (Standard Packaging Corp.) vacuum-seals pouch-packed, all-beef frankfurters at American Kosher Provision's New York City Plant.



LUNCHEON MEATS vac-pouched; quality protected.

WIENERS vacuum-pouch-packed keep fresh longer.



PICKLES vac-packed in brine, without preservative.

making for lower cost in shipments.

3. Inertness to certain package-damaging food ingredients, like fats, acids, and brines.

4. Ability to withstand high temperatures during filling and the lower temperatures during freezing operations.

5. High resistance to rough handling.

6. Sufficient impermeability to retain a vacuum or nitrogen gas for long periods.

Suppliers are now providing food packagers with combinations—comprising new and old as well as expensive and inexpensive materials. These are giving the packagers more "working tools" for protective, yet economical, packaging of more types of foods at higher production-line speeds.

No End to New Materials

Some are novel combinations of old standby materials—like foil-glassine or foil-wax-tissue-wax-tissue combinations. Almost comparable to the tin can in moisture-vapor resistance is Riegel's triple-ply lamination—a high-strength, super-calendered, printed paper that is glue-mounted to foil and polyethylene-coated on the outside.

The same supplier has developed a high-gloss coating for an outer, 5-stick gum wrap that is wax-coated to foil. New coating adds attractiveness to package and resists scuffing.

Helping to add to the variety of new materials are better laminating techniques and improved methods for extrusion-coating flexible sheets. There's also the never-ending modification of existing materials to provide new properties. And sometimes before a new material finds a firmly established application, a newer one immediately takes its place.

New laminating techniques now permit use of thinner gages of foil. Result: These heat-sealable foil combinations can now he handled at higher speeds on packaging machines. Moreover, they provide hygroscopic foods with excellent protection against product-damaging moisture, also light. Properties built into the new combination sheets depend upon the thickness and characteristics of each sheet plus the type of adhesive (laminating material) employed.

Take another example—the relatively new cellophane-polyethylene laminate. This transparent, liquid-leakproof, and extremely sturdy material is finding increasing applications in the packaging of liquid and solid foods. What's more, some of these are gas- or vacuum-packed.

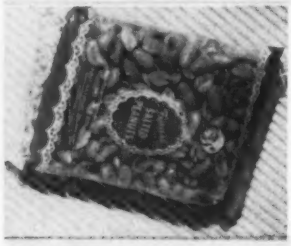
As an outer sheet, transparent cellophane adds body to polyethylene. It also has good machine handling properties, and is an excellent barrier against gas and vapor. Too, it can be printed on the reverse side as a protection against the action of certain foods, also soiling, and external scuffing.

Polyethylene, on the other hand, imparts liquid-holding, heat-sealing, low moisture-transmitting properties. And it is odor- and taste-free. Also, it is chemically inert as well as strong and flexible at sub-zero temperatures.

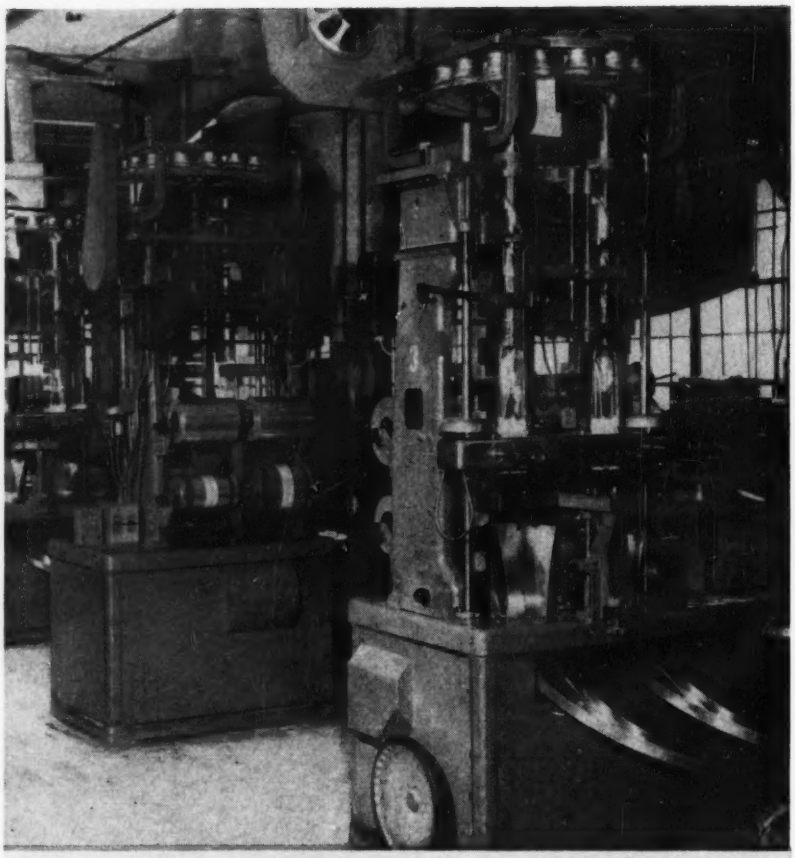
Polymers—almost a countless number of them—have been tried as coatings, using hot-resin or extrusion-lamination techniques. But up until now, only papers coated with saran, vinyl, and poly are commercially available. As they become less costly to make, more will be used in packaging a variety of foods.

KRAUT is machine filled into leakproof plastic pouch.

HARD CANDIES (wrapped) go in printed cello pouch.



SALTED NUTS volumetrically filled into cello pouch.



LINE of Stokeswrap machines at Thos. D. Richardson Co.'s Philadelphia plant form pouches, then fill them with mints and seal them—60 a min. per unit.

Suppliers are working on interesting combinations involving the new polyester film mylar, which features strength and good transparency. But sealing and machine handling must still be worked out.

Vacuumized Flexibles

Packing of certain sliced items in a vacuumized flexible package, with the purpose of protecting product quality for prolonged periods, has long intrigued processors.

In 1947, Armour's sliced bacon was offered to the consumer in a flexible vacuum pouch—a cellophane-Pliofilm combination. A year later, another firm similarly packaged sliced luncheon meats in handy 8-oz. units for self-service merchandising.

Vacuum-packed sliced cured meats (bacon and cold cuts) now maintain their original freshness for surprisingly long periods. Moreover, this packaging protects the meats from discoloration when displayed in refrigerated self-service cases under exposure to artificial light.

About 5 years ago, a Chicago firm began putting up 8 oz. packages of sliced Swiss, cheddar, and natural cheeses in Pliofilm-cello pouches that were vacuumized. Slices were shingle-packed, instead of stacked, in order to permit greater display area and easier separation of slices after opening the package. Under normal conditions, cheese so packaged keeps moist, flexible, and mold-free over a month.

Now Come the Machines

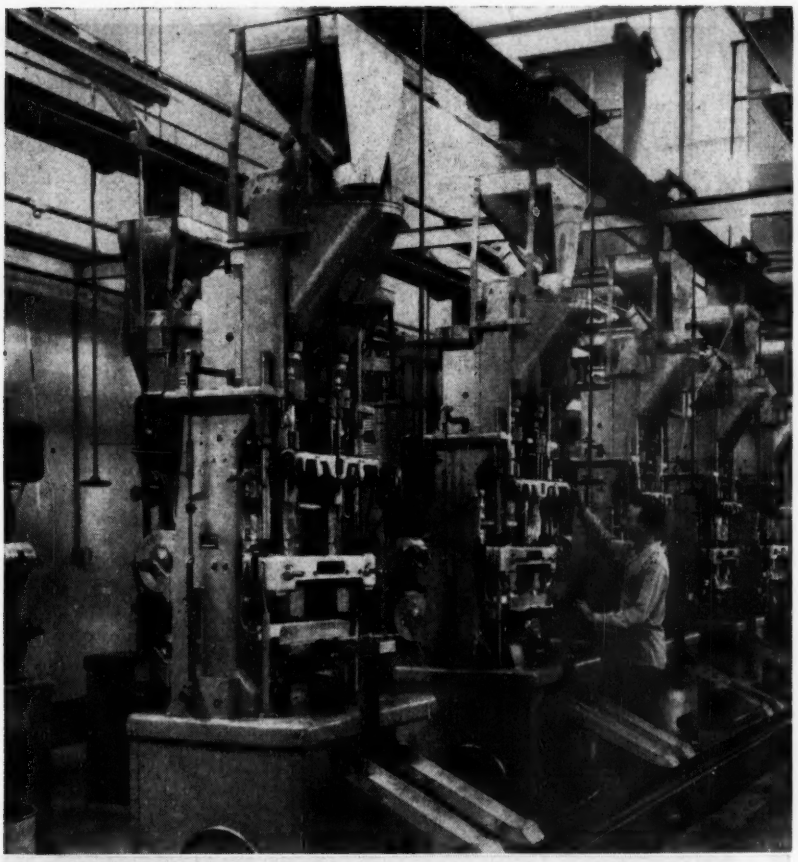
First semi-automatic machine for vacuumizing and heat-sealing pouches comprised five 4-compartment chambers mounted on a revolving central shaft. A machine operator slips product-filled pouches into each slot-like compartment for a 10-sec. vacuumizing sealing cycle. Machine's speed is 1,100 per hour.

Soon after, the same machine manufacturer (Standard Packaging Corp.) came out with an 8-head rotary unit that "upped" the output to 2,400 packages per hour.

It is to be noted that mechanizing of sliced cheese and meat packaging is a particular knotty problem, since for such sliced products no machine has yet been designed that forms pouches from a roll of material and then fills and vacuum-seals them. Slices must still be hand-packed into pre-formed pouches and then transferred to the vacuumizing-sealing machine.

Recently, Standard has developed a low-cost, corrosion-resistant, 2-head vacuumizing-sealing machine that occupies only 4 sq. ft. of space and handles 2,160 packages an hour. Speed was engineered into the unit by shortening the vacuumizing-sealing cycle and by designing alternately operating heads (while one pouch is vacuum-sealed by one head, another pouch is loaded into the second head). Thermostatically controlled fluid circulated within the heat-sealing bars prevents chilling of the bars by liquid from wet packs (like pickles in brine), which causes imperfect sealing of pouches.

By removing two screws, heads are now quickly interchangeable (in about a minute) to permit handling different size packages. And since this machine can be provided with a gassing attachment, new fields are now open for flexible packaging of foods under gas to extend their shelf-life.



DOUBLE BANK of Transwrap machines (10) pouch-package coffee at La Flor De Tibes plant in Havana, Cuba. Output is 600 packages per minute.

DRIED FRUITS packed in saran-coated cello pouch.

BISCUITS radom-packed in cello pouch.

CEREALS go in cello-bags, packed 10 to carton.

About 3 years ago, the printed cello-poly combination was developed by Flex-Vac for single-service packaging of Pasco's frozen orange juice concentrate. This same improved material was then quickly used for sliced luncheon meats and cheese. It is also being employed to put up such items as French dressing, chocolate syrup, sundae toppings, shucked oysters, wieners, and cherries in juice, as well as brine-packed pickles, olives, pearl onions, and mackerel fillets.

For packaging the juice concentrate, Bartelt Engineering and Stokes & Smith each came up with machines that form pouches from a roll, and then fill and seal them. These units might be called "whole packaging lines in themselves."

They turn out about 100 single-serving packages (2½ oz.) per minute. In stores dispensing this product, a counter unit reconstitutes the contents into 10-oz. servings of orange juice. This takes only a few seconds.

Furthermore, plans are underway to add pouch-packed servings of California frozen lemonade concentrate to the retailer's menu.

Parts of the packaging machines that come in contact with concentrate have been made corrosion-resistant. Mechanical and electrical parts are sealed and waterproofed to permit steam-cleaning of equipment. There is even an arrangement for steam-cleaning from a remote panel.

Other machine modifications have included improved lubing systems, special heat-sealing units, sealer-temperature controls, and a remotely located panel for electrical controls.

Today, packers are about to enter the home market with pouch-packed concentrates. Undergoing market tests is a cello-wrapped carton holding four 2½-oz. pouches of frozen orange juice concentrate. And Sunkist frozen concentrate for lemonade, packed eight 1-oz. pouches to a carton, should soon be on sale. Likely to follow are similarly packed frozen pineapple and grape juice concentrates.

Machine-Bagging Syrup

About 3 years ago, ice cream sundae toppings—pineapple, strawberry, butterscotch, and hot fudge—were machine-packaged in poly-cello pouches by F&F Laboratories, Chicago. Syrupy toppings are packaged by Bartelt units that form, fill, and seal 60 pouches per minute.

Pre-printed material is roll-fed to a plow-shaped mandrel that folds it longitudinally to form the bottom seal. It is then intermittently sealed together and bottom fold is again sealed for extra strength. Bags then continue to a cutting unit that forms an easy opening and serving device. Tear-notched bags are automatically opened by vacuum cups and filled with 3 oz. of 180-deg. F. syrup. Top of bags are then heat-sealed.

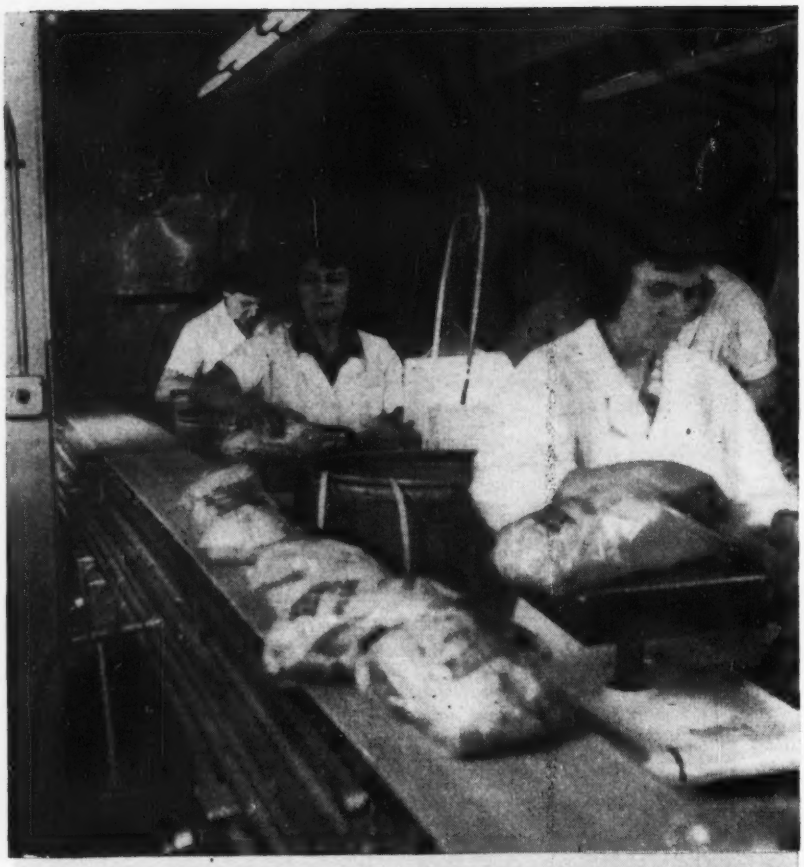
"Piggy-Back" Packages

Now being put up in a 2-in-1 package (by Suffolk Farms, Revere, Mass.,) is a combination of spinach and powder seasoning. The latter, in a small packet, is inserted in the main cello-bag. Similarly, a packet of French dressing goes in cello-bagged salad green mix. The powder—MSG and other seasonings—is pouch-packed by machine in poly-coated paper. The dressing is handled on the same machine but in a liquid-tight Pliofilm-cellophane combination. Packet-form-

DUCKS vacuum-packed in snug-fitting Cry-O-Rap bags.

FRANKS put up in similar bags keep quality longer.

RING BOLONIES vac-sealed in tight-fitting plastic bags.



ON CRY-O-VAC line, girls vacuumize, twist, and clip-seal bags of eviscerated poultry at Empire Markets' plant in Poughkeepsie, N. Y.

ing materials are roll-fed to automatic registering, forming, filling, and sealing units. Rate is about 60 packets per minute.

The same prepackager is putting up trimmed radishes (4-oz. units) and onions (2-lb. units) in polyethylene pouches that are formed, filled, and sealed by dual-head Transwrap machines. Rate is 35–40 per min. per unit.

The machine is engineered to handle non-free-flowing, root-type vegetables in weights ranging from ¼ to 5 lb. Soon to be packaged in this manner are trimmed beets and washed potatoes.

New Feeding Technique

Here, automatic, close-net-weight scaling—of onions, for example—is achieved with a new bulk-and-dribble feed system. A special bin was designed. It comprises four side-by-side horizontal hoppers for bulk-feeding large onions and an equal number of adjacent smaller hoppers for dribble-feeding small onions.

From bulk-feed hoppers, the onions are gravity-fed into four net-weight buckets. Flow is automatically cut off shortly before reaching weight, and small onions are then dribble-fed to make exact weight. Each of two weigh buckets dumps into a bag-forming-filling tube.

Machine-packaging has enabled this firm to cut labor and packaging material costs about 50%. Also featured here are devices for printing and perforating poly. They permit purchase of cheaper, unprinted material and provide package ventilation more economically. A hot die-stamping technique is employed to print, in two colors, trademark and product name. Also printed are price and net weight. The package is punched with 16 ventilating perforations (¼-in.).

Individual portions of jams and jellies were first packaged a few years ago in vinyl containers drawn by a machine developed by Kraft Foods Co. Machine forms, fills, and seals up to 300 single-serving rectangular cups per minute. This type packaging might be adopted for honey, catsup, apple sauce, peanut butter, and mayonnaise and other dressing-type products.

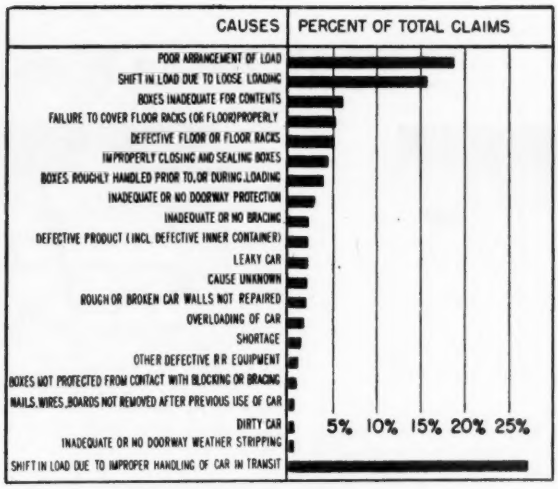
Bartelt Engineering reached into a new bag of tricks to produce a machine that makes a pitcher-shaped packet (poly-cello combination) for single-service portions of maple-cane syrup. To stand upright, packet has a flat, gusset-bottom seal. And a corner tear device provides a convenient pour opening. This syrup has also been put up in duplex cello bags.

A similar machine was specially designed for Kitchen Art Foods, Chicago, for packaging blueberry-muffin mix in a gusset-bottom pouch of a design that fits into a carton.

Pillsbury is now packaging angel-food cake mix into two separate gusset-bottom pouches that are packed into a single carton. Here, the pouch for the egg-white mix is made of Riegel's reverse-printed glassine, which is glue-mounted to foil with heat-sealable poly on the inside. The second pouch, for the flour-sugar mix, is reverse-printed coated glassine.

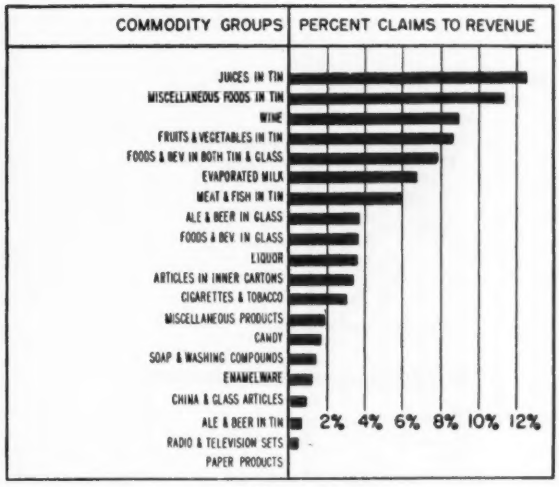
Further, this same equipment maker now has a double-compartment machine for forming a twin-pocket pouch from roll-fed, poly-coated, reverse-printed cellophane. Filled into one pocket is hydrogenated vegetable

(Turn to page 126)


CAUSES
PERCENT OF TOTAL CLAIMS
POOR ARRANGEMENT OF LOAD
SHIFT IN LOAD DUE TO LOOSE LOADING
BOXES INADEQUATE FOR CONTENTS
FAILURE TO COVER FLOOR RACKS (OR FLOOR)PROPERLY
DEFECTIVE FLOOR OR FLOOR RACKS
IMPROPERLY CLOSING AND SEALING BOXES
BOXES ROUGHLY HANDLED PRIOR TO, OR DURING LOADING
INADEQUATE OR NO DOORWAY PROTECTION
INADEQUATE OR NO BRACING
DEFECTIVE PRODUCT (INCL. DEFECTIVE INNER CONTAINER)
LEAKY CAR
CAUSE UNKNOWN
ROUGH OR BROKEN CAR WALLS NOT REPAIRED
OVERLOADING OF CAR
SHORTAGE
OTHER DEFECTIVE RR EQUIPMENT
BOXES NOT PROTECTED FROM CONTACT WITH BLOCKING OR BRACING
NAILS, WIRES, BOARDS NOT REMOVED AFTER PREVIOUS USE OF CAR
DIRTY CAR
INADEQUATE OR NO DOORWAY WEATHER STRIPPING
SHIFT IN LOAD DUE TO IMPROPER HANDLING OF CAR IN TRANSIT
5% 10% 15% 20% 25%

Causes of Damage and . . .

TROUBLES—fully 73% of them—are due to shippers' improper loading of goods (first 20 bars of this chart), followed by carriers' rough handling in transit (27%, bottom bar). But latter damage is decidedly reduced when car loading is improved.



. . . Who Suffers

Shippers, represented here by commodity groups, pay in proportion to loading inefficiencies, regardless of types of containers. Note here that juice in tin was damaged far more than beer and ale in glass. Specifically, bars show relation of claims to revenue by percent.

Damage to Packaged Food

—And How to Avoid It When Shipping by Rail

Soaring claims on product losses in RR transit—up 700% dollarwise since '39—mean more and more hard coin draining out a wider and wider hole in the food shipper's pocket . . . But just apply a few common-sense measures and you'll stitch up that wasteful rip.

FE STAFF

Grappling with lofty, rising costs in damage claims, American railroads jointly with the Fiber Box Assn. conducted an extensive study to determine the specific causes of damages to rail-shipped commodities and learn who was responsible for the trouble.

Half the railroads' claim payments are made for products shipped in fiberboard containers, even though such shipments represent but 12½% of the total carloads transported and but 25% of the carriers' gross revenue. Therefore, the study was confined to products shipped in fiberboard containers, both corrugated and solid.

During a three-year period, the condition of 3,440 individual shipments of goods was studied as the items were unloaded at destination. Cars were selected at random at terminals and warehouses in 31 cities geographically distributed over the country.

During the inspection, a detailed record was made to show type of packing used preparation of loads by shippers, and apparent handling of shipments by the railroads. In all instances where damage had been substained, the nature and extent, as well as the causes of the damage were carefully determined.

Each selected car was covered by a team of two men—one from the railroads, one from the Fiber Box Assn. Thus both impartiality and accuracy were accented in the checks.

Here are five findings of the survey:

1. In proportion to volume shipped, damage food packages in fiberboard cases, outranks damage to all other types.

2. Products other than foods, normally shipped in fiberboard containers, sustained relatively negligible damage.

3. While railroads were accounted responsible for 27% of the damage to food shipped in this type container, responsibility traceable to food processers ran more than 62%.

4. Food products sustained the greatest damage in proportion to transportation revenues.

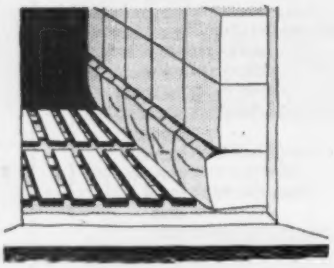
5. There were wide variations in the damages to the same type item shipped by different companies:

This clarified the overall picture and gave solid basis for approach to the problems.

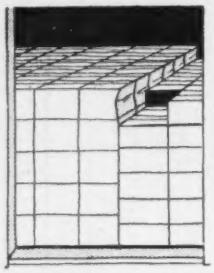
Who Foots the Bill

Most of the monetary reimbursement for damages to all products during rail shipment is paid for by the carriers. Total damage claims now amount to well over $100,000,000 annually, more than 1½% of freight revenues, as compared with ½% in 1939. In round figures, total payments climbed from $19,000,000 in '39 to $135,000,000 in '48. So the jump on the food score has been at

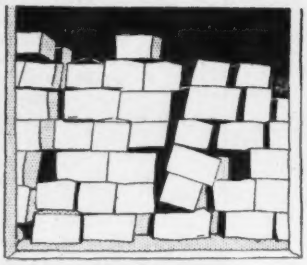
12 *Wrong* Ways and



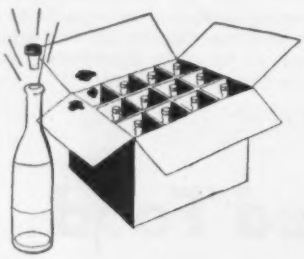
FLOOR or floor racks not covered properly. Boxes snagged between rack slats . . . Insert knocked-down cartons or corrugated sheets for protection.



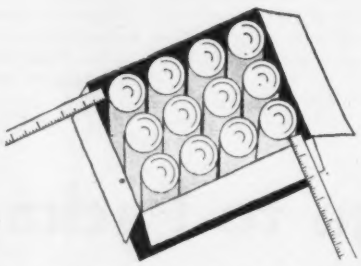
HAPHAZARD loading. Not leveled off. Lightweights and heavies not separated. Different cartons not segregated . . . Revise practices, as noted.



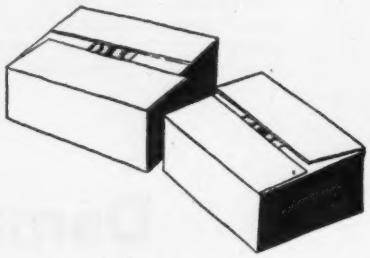
SHIFTING due to loose loading . . . Make loads tight by bracing, or fill out spaces with fiberboard.



DEFECTIVE package and/or inner container . . . Redesign package. Improve package-line procedures.



BOXES not properly sized to contents . . . Redesign cases.



IMPROPER case closure . . . Use better adhesive, improved sealing.

least 700%, since these products account for the largest amount of claims in proportion to volume shipped and revenue paid the carriers.

However, dollar and cents thus paid represent only the visible costs. Hidden costs suffered by the shipper are often much in excess of the carriers' payments.

Receiver's Viewpoint

Large retail chains that process foods, and therefore ship as well as receive carlots of food, assume a somewhat tolerant view of damage in transit—at least, one less strict than that held by such concerns as wholesalers and non-producing chains.

Nevertheless, for all receivers a damaged shipment resulting in loss is far from compensated by the carrier or the shipper.

In general, when contents of a car is damaged, receiver must segregate the damaged cases. This requires additional labor and also delays the car-unloading procedure. Segregated cases, usurping plant space, must be opened and inspected. Extra labor, followed by additional clerical work, is entailed.

Then a claim is filed. And settlement may require 60 days or more. Warehouse space is occupied for "dead storage" during a part or all of this time.

Meanwhile a portion of the receiver's capital is tied up, turning no merchandise, reaping no profit.

Finally, the product is again handled when it is returned to the shipper or sent to the railroad for cooperage, even when the receiver does not incur the expense of disposing of the damaged material.

What would you do if cars from the same shipper constantly arrived in damaged condition? Probably the same as is done by many wholesalers and chains—purchase less and less or none at all from the offending concern.

The most costly price for faulty carloading is paid by the shipper in loss of sales and drop in the good will of his customers.

Some food manufacturers are fully aware of this cost. As evidence, they require all damaged cases to be returned to shipper at once. Receiver is then reimbursed immediately, even though the company's carloading methods are far above average and the damage in transit is seldom the company's fault.

It does seem inconsistent that food manufacturers—after investing heavily in fine packaging machinery and in attractive packages and labels for maximum pulling power on the retailers

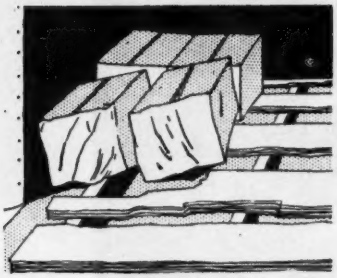
Blame . . . Price . . . and Whose Dollars

Who's responsible for the damage to processed foods in shipment? How big a price is being paid? Who pays? And do the railroads actually suffer the whole cost of such damages?

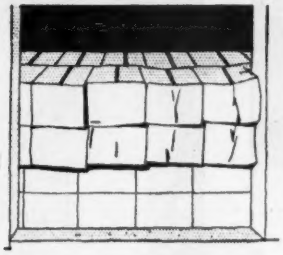
These pertinent questions are answered here—pointing the way to practical remedies that not only will cut losses but also safeguard customer goodwill.

—The Editors

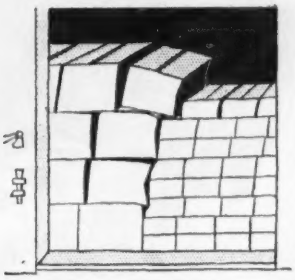
How to *Right* Them



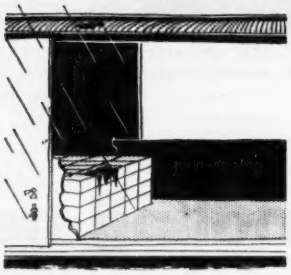
DEFECTIVE floor or racks. Broken, punctured, or uneven slats . . . Have car reconditioned. Or reject it.



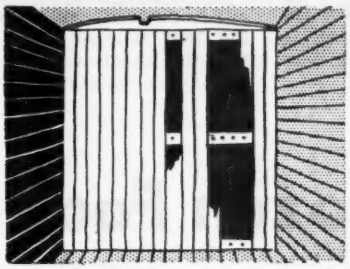
INADEQUATE or no doorway protection . . . Put metal strips across door opening, or wood fabrication with fiberboard sheets between strips and load.



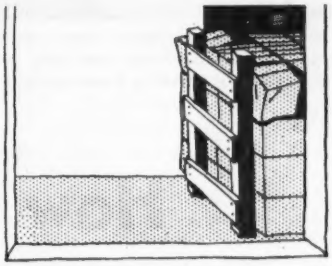
INADEQUATE or no bracing with mixed loads, partial layers, or part-loads that leave doorway area vacant . . . Use proper bracing.



LEAKY car . . . Carefully examine and plug all leaks. Or reject car.



ROUGH or broken car walls . . . Repair or cover. Or reject car.



BOXES damaged by contact with bracing . . . Provide adequate bracing surface, covering area with fiberboard.

shelf—proceed to risk extensive damage in transit due to faulty carloading.

How Not to Load a Car

Most frequent cause of damage traceable to the shipper is improper arrangement of the load. This can involve: (1) Failure to separate lightweight and heavy items, (2) failure to segregate different containers, (3) failure to level off the load, (4) haphazard loading, and (5) loose loading, leading to load shifts during transit.

The "bonded block" method of loading is recommended. Full working details for carrying it are given in Pamphlet 515 issued by the Assn. of American Railroads, Chicago.

Tight loading of boxes in a car is a most significant factor. For each type of loading, the average damage claimed for cars with loose storage was at least twice as high as the average for cars loaded without plan but tightly stowed. There appears to be no important difference between the average claim on shipments that had a loading pattern and those without.

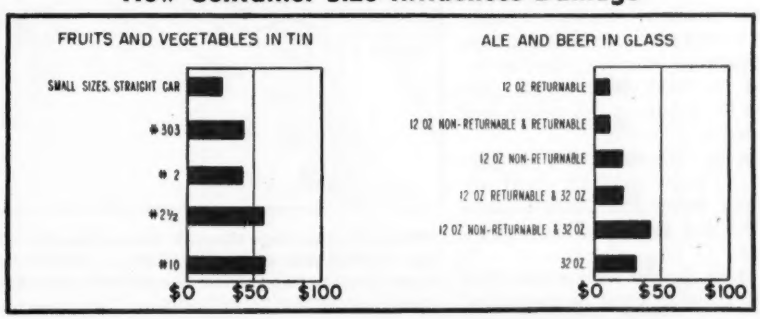
And here are 14 specific errors by shippers, in order of importance:

1. Boxes inadequate for contents.
2. Failure to cover floor or floor racks properly.
3. Defective floor or floor racks not repaired.
4. Improper closing and sealing of boxes.
5. Boxes roughly handled during or prior to loading.
6. Inadequate doorway protection, or none at all.
7. Inadequate bracing, or none at all.
8. Defective product and/or product container.
9. Rough or broken car walls not adequately repaired or well covered.
10. Car overloaded.
11. Boxes not protected from contact with blocking or bracing.
12. Nails, wires, boards left by former user of car, not removed previous to new loading.
13. Dirty car not cleaned.
14. Lack of adequate doorway weather stripping to prevent snow or rain from entering car.

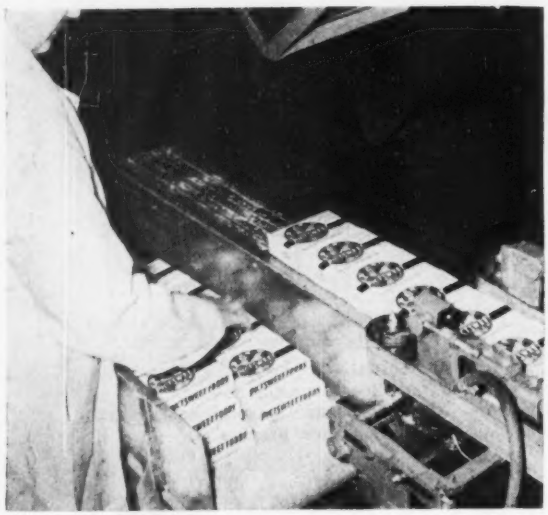
All of these loading errors are evidence of careless methods. And all can be avoided or overcome. The additional cost involved for adequate pro-

(*Turn to page* 132)

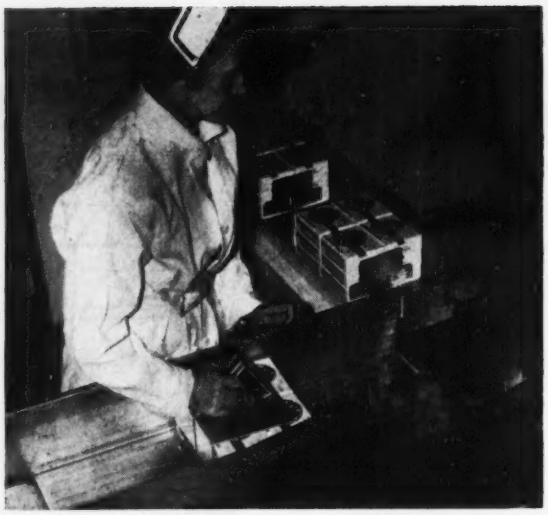
How Container Size Influences Damage



The "1, 2, 3," of Assembling and Bundling



FIRST: Cartons from wrapping machine are "wiped" by operator into two bundle-groups and onto belt that's intermittently operated by pressing knee against switch.



SECOND: With aid of special scoop, another operator transfers each bundle-group of cartons onto intermittent in-feed to bundling machine.

How Frozen Food Bundling

Tests underway point to package material savings at $18,000

E. MINNEMAN & J. F. HILL

Respectively, Fred Todt Co., Seattle, West Coast agent for Package Machy. Co., and Production Manager, Pictsweet Foods, Inc., Mt. Vernon, Wash.

Multiple-unit packaging—bundling—which promises reduced material costs, improved production and handling methods, and improved merchandising is reaching the conclusion of experiments started two years ago in the frozen-food field.

Bundling has, for several years, provided advantages in the pharmaceutical, biscuit, and extract industries, and it now seems successful in the rapidly expanding frozen-food field.

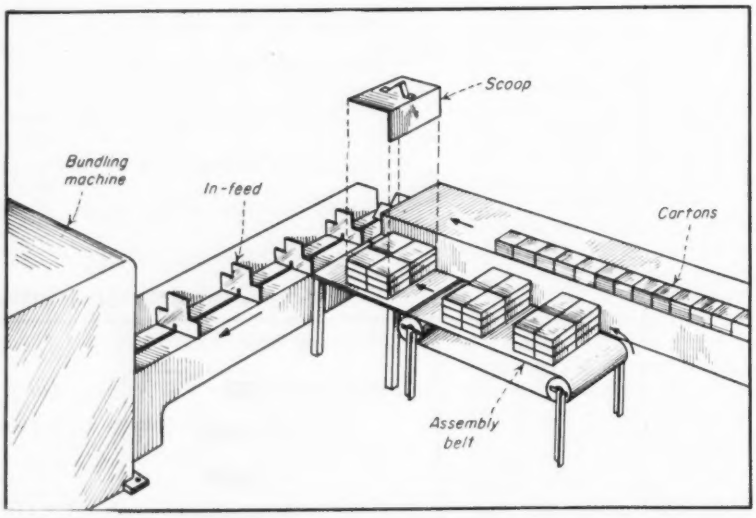
Bundling refers to the grouping and wrapping of pre-wrapped packages or cartons, usually six or twelve packages to a bundle. Some machines group, or assemble, packages from one or more lines and wrap each assembled group. Some products, however, must be assembled by hand. Nevertheless, the machine for wrapping the groups still is regarded as a bundler.

Wrapping materials used include cellophane, waxed sulphite, glued sulphite, and many kraft papers—some laminated and reinforced with other materials.

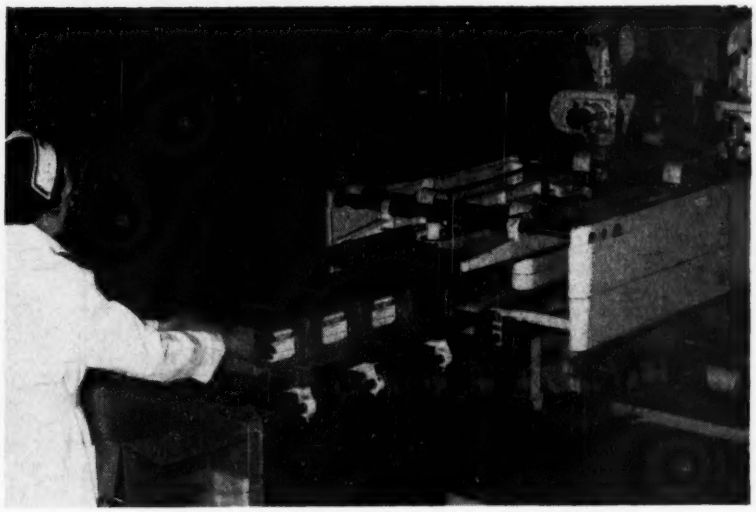
Objectives in the frozen-food field can best be understood by examining the application of bundling in other fields. Two major applications exist, and both are important in experiments now being conducted.

In the pharmaceutical industry, subbundling is exclusively used. Six or twelve packages are bundled, with identifying end seals attached. Several bundles are then loaded into a shipping case.

In the drug and extract industries, bundling is convenient for distributor and wholesaler, especially when a case must be opened for distribution.



TRAVEL of cartons through semi-automatic assembler and bundler. Note working relationship of units. Cartons coming in (right) are readily assembled manually into two's, then transferred to bundler in-feed (left). Layout is simple, indicates efficient integration.



THIRD: Four bundles coming from Package Machinery bundling machine are hand-packed into shipping case by still another operator. Speed: 25 tightly wrapped bundles (300 cartons) of frozen food per minute.

Can Reduce Costs

and $23,000 in two West Coast plants

Advantages of this method of bundlings are: (1) Savings in case costs through use of larger cases, (2) less time for wholesaler to ship out retailers' orders for half-dozen and one-dozen units, and (3) ease of billing as well as reduced handling costs (because retailers' orders are in uniform half-dozen or one-dozen lots).

Bundling in the cracker and biscuit field achieves the latter two advantages. And it completely dispenses with shipping cases, with consequent savings in case costs. Cracker packages are large, and usually a dozen packages comprise a case. So to substitute the bundle for the case was a natural step. This required new tariffs by the ICC, together with new methods in shipping and handling.

Initial Tests

In 15 years of bundling, biscuit manufacturers have saved millions of dollars on shipping cases. And the annual bill the frozen food field pays for shipping cases, plus consideration of other ends to be achieved, provided a strong incentive to push research on the development of bundling techniques.

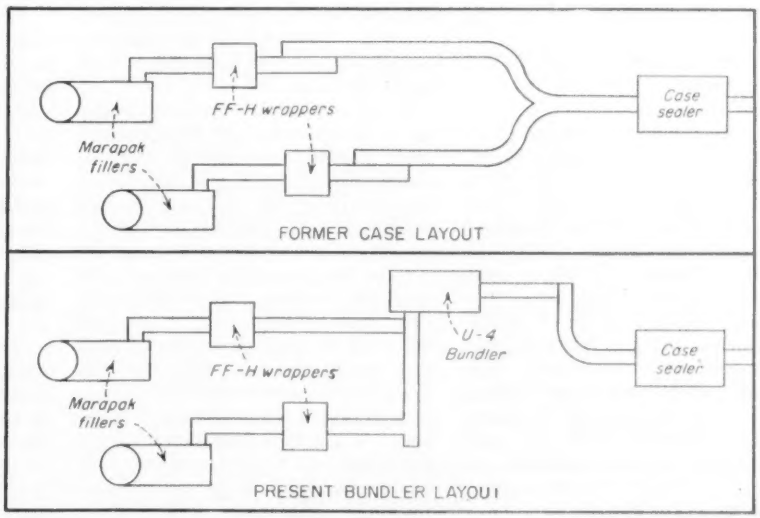
One of the first experiments in frozen-food bundling was carried out at a western plant. This experiment was set up to determine the feasibility of bundling to completely replace the packing of frozen foods in shipping cases. The firm that provided facilities for the tests had committed themselves, three years previously, to a single-dozen shipping case in contrast to the two- and four-dozen cases used by others. Its single-dozen case program had been dictated by a competitive desire to meet requests of distributors and wholesalers for a convenient-size redistribution-to-retailer unit.

Importance of the desire in this case can be seen by the following comparison of case costs per dozen packages: 4 dozen cases, $0.025; 2 dozen cases, $0.0395; and 1 dozen cases, $0.55.

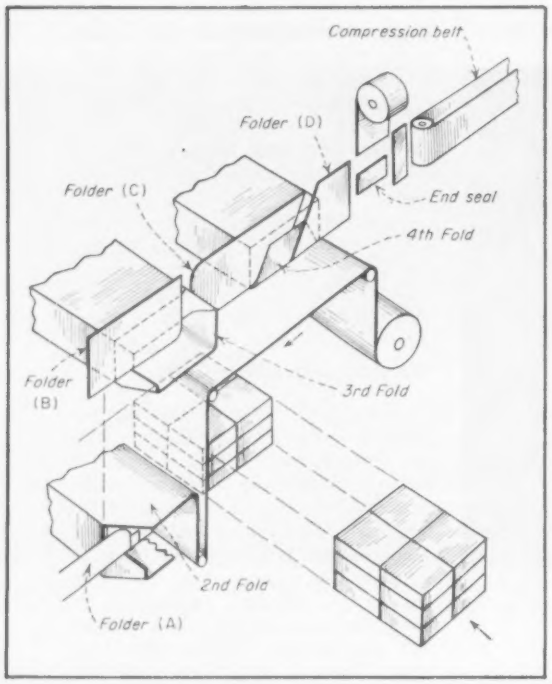
Warehouse Handling Costs

Added to these costs was the in-and-out warehouse handling for the one-dozen case (based on charges made by warehouses, which are in inverse ratio to size of the item to be handled). These in-and-out costs are somewhat indeterminant due to variations in the charges and bases for charges by different warehouses. A common basis, however, is a cost of 1½ c. per case for a 20-lb.-or-under case size. Since a two-dozen case size weighs under 20 lb., a cost of approximately $0.0075 per dozen would apply. Repetition of the charge would be based on the number of case handlings.

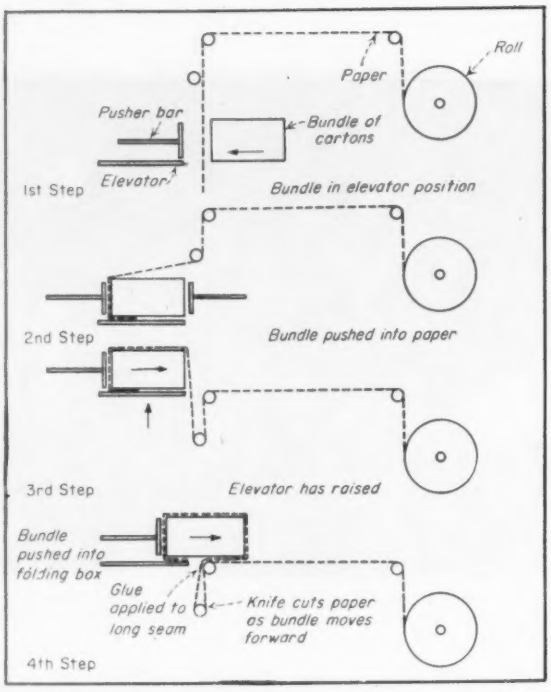
With a single-dozen commitment to their trade, this firm was a natural for the bundling experiment. Package Machinery Co., supplier of bundling machines to the pharmaceutical and cracker fields, worked closely with this firm to provide a possible answer to handle the mechanical phase of bundling. Suppliers were called in to develop special papers—strong enough for the approximately 10-lb. load of



LAYOUT comparison between old and new 300-carton-per-minute "repack" line on loose-fill frozen products at Pictsweet Foods, Inc., Mt. Vernon, Wash. On present line assembling of cartons is semi-automatic, and output from two wrapping machines is handled by one bundler.



HOW PROGRESSIVE fold permits variations in bundle heights without elaborate machine changes. Bundle pushes into spring-loaded folder (A) for 1st fold. Folder (B) makes 2nd fold as bundle is raised on elevator, and 3rd fold is made by folder (C). After glue is applied inside 4th fold, latter is plowed upward by folder (D). Thermoplastic coated end-seal is cut from roll and applied to bundle going to compression belt.



FOUR STEPS to operation of self-measuring paper feed on bundler. (1) Bundle arrives at elevator, ready to be pushed into roll-fed paper. (2) Bundle is pushed so that wrapping paper goes around it. (3) Elevator raises, with paper still under tension. (4) Bundle is pushed into folding box, where glue is applied along long seam of wrapping paper. As bundle then moves forward, knife cuts paper to complete the wrap.

the one-dozen frozen-food bundle.

A review of the machine company's eight different models of bundlers was based on several requirements for the new frozen-food bundle. Required was an extremely tight wrap, rapid size changeover, flexibility in meeting dimensional variations of frozen-food packages, and ruggedness for handling the heavy package load.

None of the models used for other bundling purposes appeared to meet all requirements.

One machine, which had previously been only used for heavy wrapping gave definite promise. So, conversion of this machine into a bundler was undertaken. This machine possessed the necessary ruggedness. It has the exclusive self-measuring paper feed, which gives a very tight wrap. Size changeover could be made by switching the paper roll and by readjusting one handwheel. Glue applicators were provided, end-seal units were installed, and special spring loading of folding parts—to provide flexibility for package variations—was accomplished.

Special Wrapper Developed

Research on paper was undertaken by Thilmany Pulp & Paper Co., though a number of other paper firms have since contributed to this effort. Developed for the first experiment was a material called "Vapotite," which consists of two sheets of laminated creped kraft with a low water-vapor-transmission rate and a high wet-strength value. Imbedded in the laminant was a criss-cross web of glass fibers that further added to the sheet's strength. Cooperation of adhesive companies was obtained to provide special glues for the sheet.

Warehousing and stacking experiments were conducted. It was anticipated that the new bundle, standing alone without a case covering, would not withstand the required stacking heights. Tests, however, proved the reverse.

Cases must normally be oversize for rapid case loading. Due to their oversize, cases tend to bend at the side wall until the load above rests on packages within the case. After the side walls have bent outward, little support is provided by the structure of the case. As a result, tests showed stacking heights on Vapotite-wrapped bundles to be equal to permissible case-stacking heights.

During the development, the frozen-food firm began to express serious concern for the in-and-out handling charges they had been suffering on their one-dozen size cases. By the time the experiment had gone into full swing, this firm also requested separate tests for collating four one-dozen bundles. This was accomplished by an automatic steel-strapping machine that employed two steel straps to group four bundles.

First carload shipment left the West Coast for Jersey City, with half the car loaded with unstrapped and the other half with strapped bundles. When the car was opened in the presence of ICC officials, unstrapped bundles showed less breakage than normal loss on case goods. Strapped bundles, however, suffered badly. Straps cut through the bundle material, the package, and into the product.

Making a Fresh Start

Though further shipments were made by this firm, grouping of dozen bundles or dozen cases into groups of four to save warehousing costs had become such an important factor that management decided to abandon the experiment on bundling in favor of tests on a machine to simply group their one-dozen cases. A four-bundle case could not be used by this firm. Its distributors had learned to use the one-dozen case for re-shipment, and

they refused to use extra labor to open the four-dozen case and remove the four bundles.

After abandoning the experiment, the bundling problem was re-evaluated. The objective still remained—to accomplish savings for frozen foods equal to those in other fields. After a comparison between costs of Vapotite and kraft paper and of two- and four-dozen cases (plus a consideration of in-and-out charges), it was decided to set up tests on sub-bundling frozen foods with a large Northwest processor. A hypothetical 12-month output of one plant was taken as approximately 18 million packages and, on this basis, cost comparisons were worked out as shown in Table I.

Pictsweet Foods, Inc., Mount Vernon, Wash., gave serious study to these figures and decided to make a single-machine, single-plant experiment for the 1954 season. The experiment has just been launched, and much work still lies ahead to obtain proof of the soundness of the bundling program. Sufficient tests have been run to determine the adequacy of the wrapping material (60-lb., 2% wet-strength Fourdrinier kraft). But several other questions still remain:

1. Does the one-dozen bundle fit present frozen food-distribution methods? If not, what can be done to change these methods to accomplish the savings possible for the frozen-food field? While Pictsweet feels bundling is sound from all standpoints, this firm anticipates need for educational work, through their sales department, in assisting distributors and wholesalers to plan their sales around the new unit.

2. Does bundling have an application as a direct merchandising medium for group sales at the retail level? "Specials" on one-half dozen sales have enjoyed considerable success at the retail level. The Pictsweet sales organization feels that there may be a definite place for a one-dozen unit in the retail market, using the bundle as a merchandising medium.

3. Can a method of four-bundle grouping be worked out, which will permit the frozen-food field to dispense with the shipping case so that material savings on case costs can be realized and, at the same time, costs on warehousing in-and-out charges be held to a minimum? Can the paper companies produce better and stronger papers in quantity and cheap enough to make it possible to eliminate the case?

Experiments, prior to the one launched this year by Pictsweet, have not been sufficient to create a true market and distribution reaction to the new bundling program. Within

(Turn to page 130)

TABLE I—COMPARISON of Case vs. Bundling Costs

CASE COSTS

Following data is based on carton (5¼x4x1 7/16 in. and 12-count bundle 10½x8x4⅜ in.:

175-lb. test	2-doz. size	$79.00/M = $0.0395 per dozen
175-lb. test	4-doz. size	$100.00/M = $0.0250 per dozen

KRAFT PAPER COSTS FOR BUNDLING

Based on 60-lb., 2% wet-strength Fourdrinier kraft
Size of paper on bundle approximately: 27 x 16 = 432 sq. in.
60-lb. basis weight is based on weight of 500 sheets
(measuring 24x36 in.). Therefore, 24x36 in. = 864 sq. in.
432/864 = X/60. Therefore, X = 29.2 (weight of 500 bundle wraps)
29.2x2 = 58.4 (weight of 1,000 bundle wraps)
Cost of kraft paper is approximately $9.50 per CWT of $.09/lb.
58.4 x .09 = $5.26 per M bundles or $0.0053 per bundle (per doz. cartons)

END SEAL COSTS FOR BUNDLING

Cost of seals: $0.50 per M
Two seals for each bundle, so cost is $1.00 per M bundles (approximately)
$1.00 per M = $0.001 (cost of seals per doz. packages)

BUNDLE SAVINGS

Cost of 2-doz. cases (no bundling)	$0.0395 per doz.	
Cost of warehousing " in-and-out "	$0.0075 per doz.	.....$0.0470 per doz.
Cost of 4-doz cases (per doz.)	$0.0250	
Cost of kraft paper (per 1-doz. bundle)	$0.0053	
Cost of end seals (per 1-doz. bundle)	$0.0010	.....$0.0313 per doz.
	$15.70 per M =	$0.0157 per doz.

Using hypothetical 18-million-annual-package-run for one plant:
18,000,000 ÷ 12 = 1,500,000 bundles (or doz.) or 1,500 M doz.
Annual savings: $15.70 x 1,500 = $23,550

TABLE II—ANOTHER Comparison of the Costs

CASE COSTS

Following data based on 1-lb. fish-fillet carton and 12-count bundle:

175-lb. test	1-doz. size	$55.00/M = $0.055 per doz.
175-lb. test	3-doz. size	$81.36/M = $0.027 per doz.
175-lb. test	4-doz. size	$127.20/M = $0.032 per doz.
Cost of using 1-doz. cases	$0.055	
Plus 4-doz. master case	$0.032	.....$0.087 case-material cost per doz.

KRAFT PAPER COSTS FOR BUNDLING

Based on 60 lb., 2% wet-strength Fourdrinier kraft
Size of paper on bundle approximately: 27 x 15 = 405 sq. in.
60-lb. basis weight is based on weight of 500 sheets,
measuring 24x36 in. = 864 sq. in.
405/864 = X/60. Therefore, X = 28.1 (weight of 500 bundle wraps)
28.1 x 2 = 56.2 (weight of 1,000 bundle wraps)
Cost of kraft paper approximately $9.50 per cwt. or $0.09/lb.
56.2 x .09 = $5.06 per M bundles, or $0.005 per bundle or per doz. packages

END SEAL COSTS FOR BUNDLING

Cost of seals $0.50 per M
Two seals used for each bundle—so cost is $1.00 per M bundles (approximately)
$1.00 per M = $0.001 (cost of seals per doz. packages)

BUNDLE SAVINGS

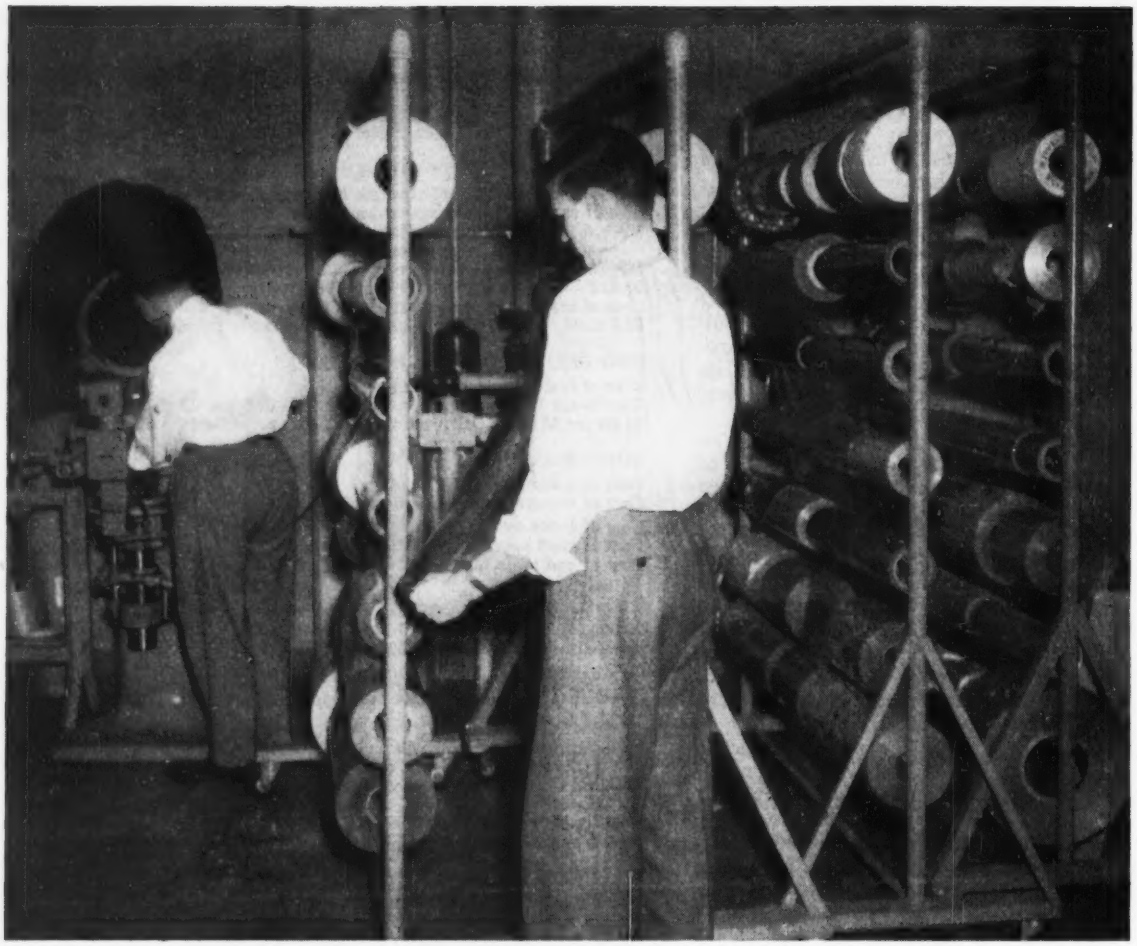
No. 1 Saving:
1-doz. bundles in kraft paper plus master 4-doz. case vs. 1-doz. cases:

Cost of 1-doz. cases (no bundling)	$0.0550 per doz.	
Cost of warehousing " in-and-out "	$0.0075	.....$0.0625
Cost of kraft paper (per doz. bundle)	$0.0050	
Cost of end seals (per doz. bundle)	$0.0010	
Cost of 4-doz. master case (per doz. bundle)	$0.0320	.....$0.0380
	$24.50 (savings per M bundles) =	$0.0245 per doz.

No. 2 Saving
1 doz. bundles in kraft paper plus 4-doz. master case vs. 1-doz. cases plus 4-doz. master case:

Cost of 1-doz. cases	$0.0550 per doz.	
Cost of 4-doz. cases	$0.0320 per doz.	
Cost of warehousing " in-and-out "	$0.0075	.....$0.0945 total cost
Cost of kraft paper plus end seals plus 4-dozen case (see above)		$0.0380
	$56.50 (savings per M bundles) =	$0.0565 per doz.

Using hypothetical 4,000,000 annual 1-lb. package run for one plant:
4,000,000 ÷ 12 = 33,330 bundles or doz.
Savings shown in #1:
$24.50 (saving per M) x 333.3 = $8,165.85 savings per annum
Savings shown in #2:
$56.50 (saving per M) x 333.3 = $18,831.45 savings per annum



OPERATING a fully equipped packaging lab, Kraft determines best materials for proper and economical packaging. Here, films, foils, and papers are neatly stocked for test purposes. Stock is kept fresh by rotation.

How Kraft's *Package Lab* Works

★ Thinking Behind It ★ Facilities ★ Handling "Specs" ★ Solving Package Problems ★ Dividends to Company

JOHN V. ZIEMBA and LLOYD E. SLATER
Associate Editors, Food Engineering

"A progressive company is intensely concerned with the quality of its products and how it's maintained with adequate packaging. Yet equally important is the consumer's first impression of the product's package—how it looks, opens, recloses, and fits into her storage shelves."

This clearly defines the attitude of Kraft Foods Co. toward all of its packaged foods. And it's one prime reason why this far sighted company has been among the leaders in improving food packages and in making notable packaging contributions in the industry.

There's no secret formula for welding a satisfactory kinship between product and package. Both have to be tops in their class. To make them so involves research—and the more the better. Package research goes far in assuring both retailer and consumer that the company is ever intent on supplying them with the best.

Top management long was convinced that packaging research played a vital role in selection of the right package to protect the quality of its ever-increasing varieties of foods. The company has been continually making notable strides in food-packaging since 1917, when processed cheese was first tin-packed.

Kraft's Packaging Research Lab

Packaging research and development moved so fast and in so many different directions that top management

decided something must be done about it. And do something it did!

For when the company's ultra-modern, research facility was recently centralized in Glenview, Ill., specific attention was given to the new packaging laboratory. The latest package-testing equipment—some specially designed by the company—was acquired.

Next step was careful screening of the field to get trained personnel—experts on specific types of packaging materials like films and foils, glass containers and closures, and cartons or shipping containers.

Now for the first time, Kraft had located its packaging research personnel, materials, and equipment in one spot. So, for the first time, responsibilities for packaging research, development, and control are pinpointed. These responsibilities fall under the leadership of C. W. Kaufman, vice-president in charge of research, and L. J. Hayhurst, head of the packaging section of research laboratories. H. H. Mottern is manager of research.

And the new packaging department is paying off. With an orderly program to guide lab operations, more research results are attained faster, at less cost, and reliably.

In a nutshell, this lab develops, recommends, and specifies packaging materials to protect the company's products both efficiently and economically.

What Centralization Achieves

Formerly, packaging research was diffuse. Involved were many people having only incidental packaging responsibilities. Investigations were not centralized and well organized. Research was carried out mainly by suppliers, backed up by outside laboratories and the company's own control lab.

Extra efforts were often required to familiarize those outside the company with the specific problems. Background technical information on company products, processes, and equipment had to be furnished as a basis for the proper research.

With Kraft, package research has always been a cooperative give-and-take endeavor. The packaging laboratory is constantly working with suppliers of plastics, glass containers, closures, adhesives, films, foils, and other materials. They come to the lab for suggestions on the application of their new materials. And the lab's carefully prepared specifications have won the respect of large firms manufacturing packaging materials.

Not only are suppliers promoting improvements in the company's packages, but so, too, are the consumers. Suggestions on using packages in the home arrive at the laboratory, and they stimulate research.

Sometimes packaging improvements are passed on to the entire industry. New packaging developments are publicized at scientific meetings held throughout the country and attended by researchers.

Why the Lab?

Major aims in building the well-equipped laboratory were to—

1. Get results more rapidly and economically.

2. Achieve service-group function by aiding every branch of the company—production, engineering, purchasing, and sales departments—as well as the company's various plants throughout the country.

3. Study more carefully packaging problems so as to determine more precisely the materials required.

4. Set up specifications that will give suppliers better information for producing materials needed for product protection and high-speed packaging. For "specs"—put down in "black and white"—save both supplier and company time and money.

5. Establish minimum requirements on materials for maximum economy without overpackaging.

6. Keep abreast of developments of new materials that might advantageously be used for company products—with an eye on their costs, product-protection, and machine-handling features.

7. Develop suitable packages for efficient and attractive packaging of the company's never-ending variety of new products.

8. Meet the challenge of new marketing methods packaging-wise.

9. Check incoming materials for adherence to specifications.

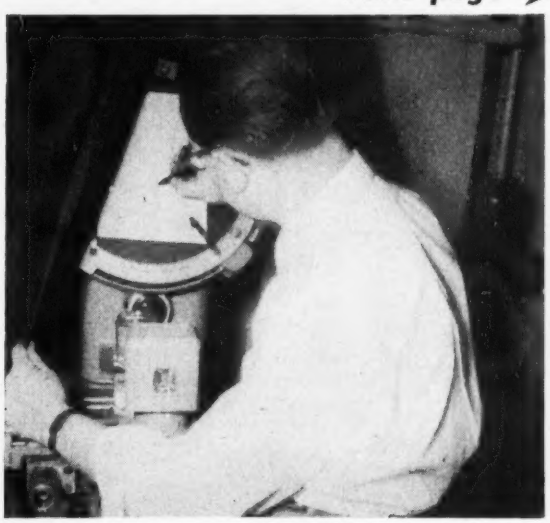
10. Contribute to packaging technology not only in the company but in the entire industry.

Within the short time the lab has functioned, experi-

"BIG 9" OF PACKAGE TESTS

Turn page→

1 HUMIDITY CABINETS (constant-temp types) adjust to any weather conditions for package tests.



2 SHADOW COMPARATOR, adapted from metal-working industry, measures glass containers and closures.

ence has shown that time and money have been spent profitably. Notably, it has made possible major advances in packages that meet product and handling requirements on packaging lines.

It has proved that suppliers sometimes over-met specifications and that even the company over-packaged products. The lab has shown suppliers where they were losing by giving "too much package." Too, the company saved by not over-packaging. Take the case of short-time-holding cheese. By using less costly material and closely controlling inventories, significant savings were attained.

There's a limit to specifications. A single packer could not practically make a radical change in specs for glass containers without considering the entire industry. For this change might adversely effect the cost of containers —especially if they can't be turned out at a high-volume rate.

Latest Testing Equipment

No stone was left unturned in the effort to equip the new packaging lab with latest devices for testing cartons, wrappers and liners, glass containers and closures, and shipping containers.

Significant are the cabinets where temperature and humidity are controlled to duplicate—at accelerated rates—weather conditions to which packaged foods are subjected. Here, packages get the "rough treatment" as they are tested for aging, durability, and moisture protection at high or low humidities, high or normal temperature, or any humidity—temperature combination.

There is also a refrigerated, self-service type dairy display case for evaluating packaged items under actual retail conditions. Particularly studied here is the effect of artificial light on the packaged foods.

Shadow Comparator

New among the testing equipment is a machine- tool comparator adapted by the company for accurate measurement of the finish on glass containers and closures. Employed is a beam of light to cast a highly magnified shadow (50 X) of a closure or jar top onto a graduated (0.001 in.) glass screen. Deviations are determined by placing an outline of a standard reference (closure or container) over the shadow of a test sample.

Among other devices are:

1. A Mullen tester for measuring bursting strength (psi.) of paper, corrugated board, and solid paperboard.

2. Tensile tester for determining the strength and elongation of films, foils, and papers.

3. Compression tester for measuring the stacking resistance (psi.) and deflection (in.) of shipping cases. Test simulates warehouse stacking conditions, and results are read directly on a dial and recorded on a chart.

4. Photo-volt reflectometer for evaluating brightness of paperboard for printing purposes.

5. Specially designed cutter for forming square- or wedge-shaped cheese.

6. Company-built vacuum sealer for flexible-type packages. Unit has observation window and gages for vacuum, sealing-temperature, and pressure.

Facilities are also available for carrying out tests for basis weight, porosity, smoothness, thickness, water and oil absorption, scuff resistance, rigidity, folding endurance, and water-vapor resistance.

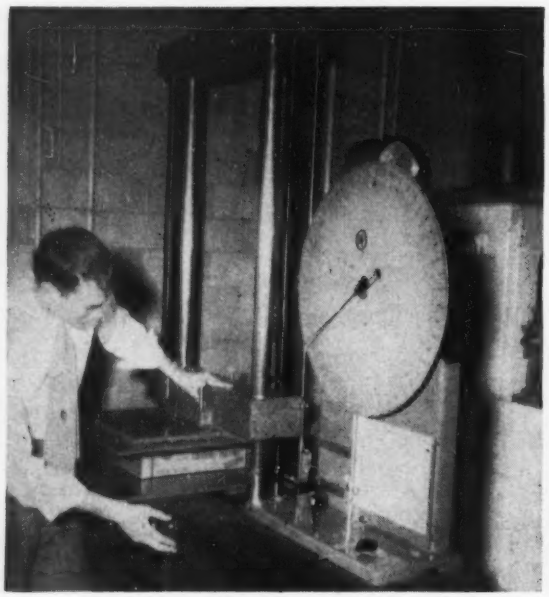
Torture Room for Shipping Cases

Adjacent to the main packaging laboratory is a room for testing shipping containers. Three devices—drop, incline-impact, and vibrating testers—subject shipping cases to conditions simulating dropping, bumping, and freight car and truck handling.

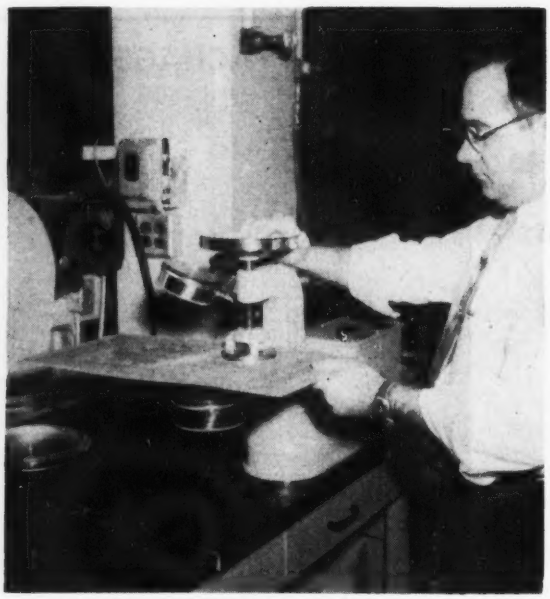
Incline-impact (bump) tester simulates freight car jolting. Case travels down a 11-deg. incline (various distances up to 10 ft., ¼ ft. increments) and strikes a vertical oak wall. New here is an automatic tripping device that returns case to pre-set distance on incline to repeat impact test any desired number of times.

Cases put to the vibrator test are examined for any scuffing off of printed surfaces. The test is similar to

"BIG 9" TESTS (Cont'd)



3 COMPRESSION TESTER is used to determine stacking resistance and deflection of shipping cartons.



4 BURSTING STRENGTH of paperboard is quickly checked on standard Mullen testing device.

truck- and freight-car vibrations. Measurements are length of test (time) and vibrations per minute.

The drop test determines damage when a shipping case is released from various heights (up to 5 ft., 3-in. increments) to fall onto a concrete floor. From any level, cases may be released from a maximum of 13 different attitudes to strike the floor—flat or on edge.

How Lab Is Organized

Making up the packaging laboratory are 15 trained specialists working in groups under the direction of the packaging-section head, who is responsible to the manager of research. The latter, in turn, is responsible to the vice-president in charge of research and development. Each group is assigned projects to be worked out in the following specific areas:

Cartons and shipping cases. Testing of these materials is the task of two technicians. These men also aid other project leaders assigned to follow through on the evaluation and development of a complete set of packaging materials for a new product.

Glass containers and closures. Evaluation of these materials is the job of one man, specifically in relation to performance of the items on filling, closing, and labeling machines. This man also works with engineering, production, sales, and advertising departments on development of improved glass-packed products.

Wrappers, films, and foils. One man devotes his time to wrappers for pre-sliced cheese and carton liners for hot- or cold-packed processed cheese and cheese products. Another man familiar with these packaging materials evaluates them specifically for cut and wrapped natural cheeses like American, Swiss, brick, and limburger.

Special packaging materials. Screening new films and combinations is the task of one man. For example, he looks—but in a limited way—into the application of saran as a food package for certain Kraft products. He tries it out for cheese links, checking its strength, product-protecting features, and handling on machines. Then he may use it as a bag for confections, a wrapper for natural or processed cheese, or as a carton liner for forming hot-packed cheese into loaves.

What a Carton Must Put Up With

Folding cartons. Evaluation of cartons is the job of one man. Cartons for ½-, 2-, and 5-lb. loaves of processed cheese serve not only as a package but a mold. The carton must be sufficiently rigid to go through the liner former, filler, top-liner sealer, carton packer, and case-gluer-sealer without damage. Then it must shape the cheese while stack- or tunnel-cooled, and it must also hold up while stacked in warehouses and refrigerated display cases in retail stores.

Part of this man's project might be assigned to others —those working on carton liners and shipping cases. If it's a matter of stacking a certain number of 30 to 36-lb. shipping cases on a pallet, then a limit must be set on the number of pallet loads that can be stacked without damage to cases. Or, for example, the compression tester may distort the shipping case 1 in. and thus rule it out.

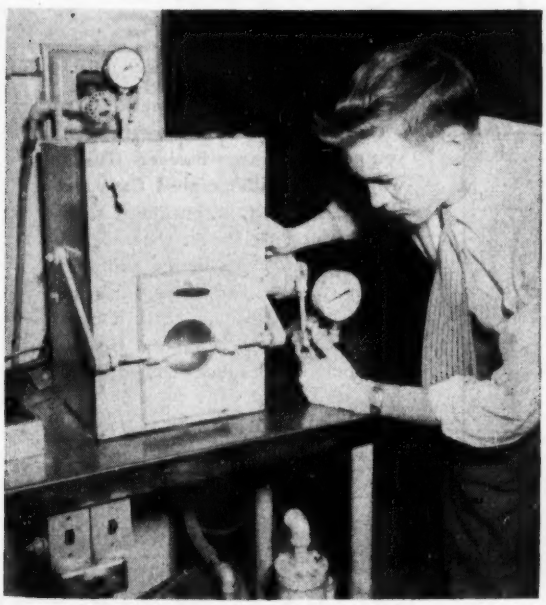
Special long-term studies. Check of factors relative to boxes, shipping cases, and in-plant-use containers involved primarily in special manufacturing procedures require the time of two men. Typical in this category are the special Christmas gift boxes and the re-usable folding-type plyveneer box for packing 40-lb. blocks of American cheese.

All About Specs

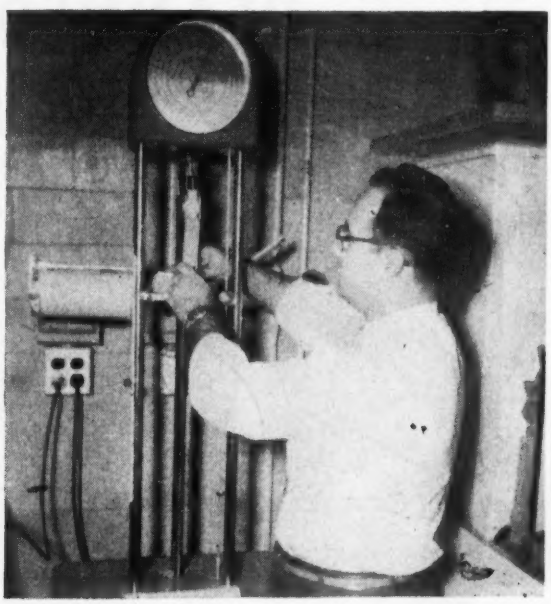
Specifications. One man devotes all his time to assembling specifications established by lab specialists on all packaging materials. He then prepares specs and submits them to headquarters to be mimeographed, checked, and cleared through a specifications section for distribution to plant managers, laboratory, purchasing, sales, advertising, engineering, and suppliers.

Drawings for specs. One man is responsible for preparing numbered drawings that accompany specifications.; For instance, die-cut cartons are illustrated, dimensioned, numbered, and attached to the specification sheet.

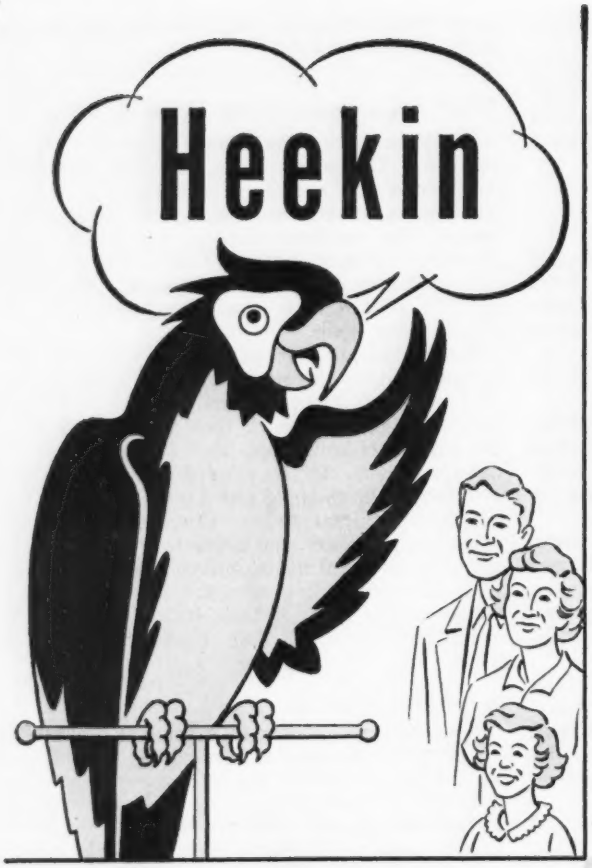
Turn page→



5 VACUUM SEALER was company-built for test-vac-packing of products in flexible packages.



6 TENSILE TESTER is employed to measure tensile strength and elongation of films and papers.



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YOUR product comes *first.* That's your business. The can you pack it in is *our* business. That's why Heekin Lithographed Cans are Product Planned . . . beginning with the product itself . . . the type of can, the shape, size, design and true lasting colors . . . all this is our business. Think it over . . . talk it over . . . then talk to us about Heekin Lithographed Product Planned Cans.

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Use coupon on page 179.

Drawings not only make certain specs more precise, when purchasing from suppliers, but also show the advertising department those areas restricted to printing or advertising copy. If, for instance, printing ink bleeds into glue flaps, a sealing problem is likely to result on the packaging line.

Concerned in the specifications are the answers to such questions as: Is the package compatible to present materials-handling practices? Does it satisfy chain-store operators? Unpack readily in the store and home? Run through production lines? Nest well in mass displays? Stand up in refrigerated display cases? Does light or moisture affect it? Does it have easy opening and closing devices? Does the package adequately protect food products for a reasonable period?

Specifications for 6½-oz. Pabst-Ett process cheese, for example, must be set up for nine different packaging materials, and each must be code numbered. Drawings—also numbered—must accompany the specifications of six of these materials. One material, the cannister, must have two drawings. Materials include bottom circle wrap, top wrap, overwrap, cannister, top and bottom disk, neck label, adhesive, and shipping cases for the 1-doz. and the 6-doz. packs.

Detailed specs on a wrapper may cover: Material stock, type of coating, weight of coating (desired, minimum, and maximum), dusting material, dimensions of roll stock (width of roll, maximum dia. and size of core), cut-off dia. width, yield of roll in ft., etc.

Tackling Field Problems

Trouble-shooting. One man investigates packaging problems likely to arise in the field. He might, for example, be called to Dallas to determine what's wrong with ½-lb. carton-packed processed cheese. He checks the carton, wrapper, and adhesive to see if they come up to specs. Maybe only minor on-the-spot changes or slight spec modifications would be needed as a solution to the packaging problem.

Sometimes, a problem may defy solution by the trouble-shooter, plant production manager, and quality-control man. A project would then be set up and assigned to package research.

In further instances, other lab packaging specialists, knowing that the trouble-shooter proposes making a field trip, might ask him to size up a package—for adherence of labels to a new glass container, delamination of a wrapper, or mishapen foil-wrapped cream cheese in refrigerated cases.

Finally, there are two lab technicians who prepare sample food packages for evaluation when subjected to holding tests in humidity cabinets and refrigerated display cases.

Each project is budgeted, and a time limit is set for its completion. Specified amounts of money are set aside for service projects for sales, purchasing, production, and engineering. If one of these departments has a long-term research project, it must obtain approval for appropriations from the director of research before investigations can be carried out.

Only ½% Damage Claims

What progress, specifically, is being credited to packaging research?

Through constant evaluation of the performance of shipping containers, the laboratory has been able to establish minimum requirements for maximum economy. By improving the quality of containers, strength requirements have been reduced without increasing damage claims. Today damage claims amount to only ½% which is a significantly low figure.

Recent Developments

Working with a supplier, the packaging laboratory came up with a special cap liner for glass-packed salad products. It was designed to curb rancidity by keeping out oxygen. The new liner comprises a saran sheet that is laminated to a new paper board to provide the paper inner cushion for the cap.

New products are constantly presenting packaging problems. Take, for instance, the new spread, Cheez Whiz, which is put up in glass containers for the consumer trade and tins for the institutional. Problems involve the style of cap and easy jar-opening features as well as a suitable can liner.

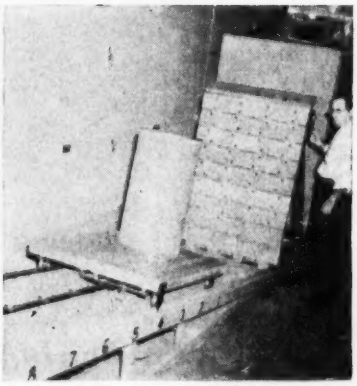
Package research and engineering adopted a process-meat packaging machine for packaging cheese in saran links. This unit fills cheese into saran tubing, clip-seals ends, and labels. Product has longer shelf-life in this attractive, transparent, moisture-proof, cylinder-shaped package.

An improved, more spreadable margarine presented a problem—oil-staining of the package when displayed too

(*Turn to page 136*)

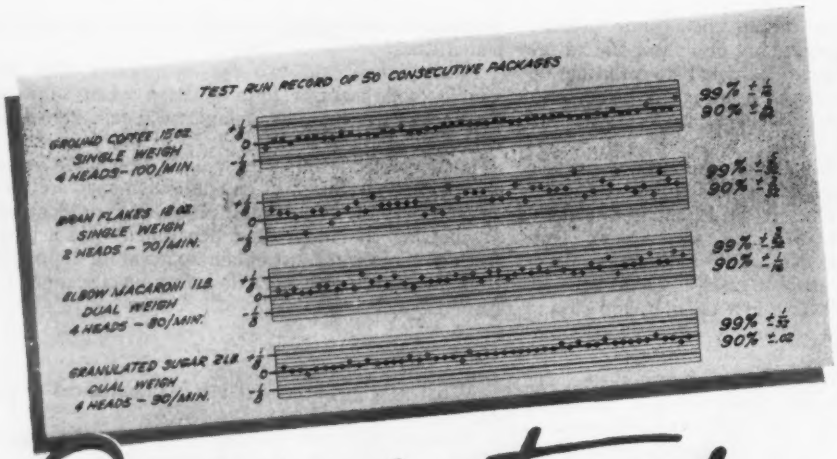
"BIG 9" TESTS (Cont'd)

7 VIBRATOR simulates conditions to which cases are subjected in trucks and freight cars.



8 CONBUR incline-impact tester gages damage resistance of shipping cases, paperboard drums.

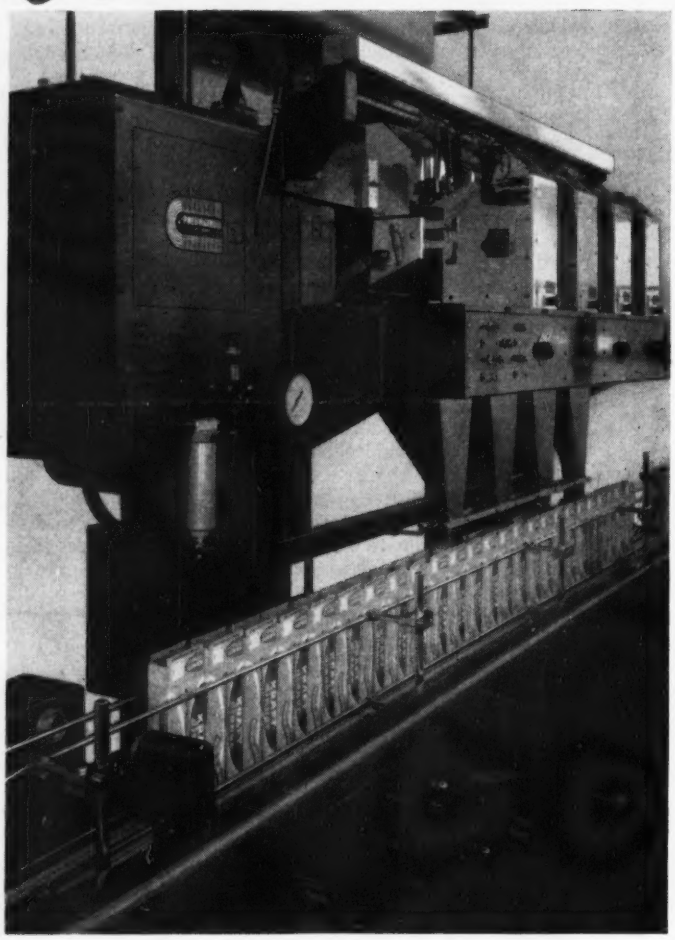
9 DROP TEST is specifically designed to learn how shipping cases stand up during rough handling.


TEST RUN RECORD OF 50 CONSECUTIVE PACKAGES
GROUND COFFEE 15 OZ. SINGLE WEIGH 4 HEADS - 100/MIN.
99% ±1/4
90% ±1/8
BRAN FLAKES 18 OZ. SINGLE WEIGH 2 HEADS - 70/MIN.
99% ±1/4
90% ±1/8
ELBOW MACARONI 1LB. DUAL WEIGH 4 HEADS - 80/MIN.
99% ±1/4
90% ±1/8
GRANULATED SUGAR 2LB. DUAL WEIGH 4 HEADS - 90/MIN.
99% ±1/4
90% ±.02

For the best net yet...

Pneumatron

WEIGHS WITHIN HUNDREDTHS OF AN OUNCE!



The secret of Pneumatron is relatively simple—the results little short of miraculous. An air actuated control measures deflection in millionths of an inch—while weighing within hundredths of an ounce.

Delicate? No! There are no knife edges to wear or corrode, no fragile trip mechanisms to get out of adjustment. PNEUMATRON weighing is—

FAST—The Pneumatron head weighs more than twice as fast as any previous weighing beam. Two Head machines may be used where four scales were formerly required.

CONSISTENT—Weights hold to the line month after month without adjustment of controls.

ACCURATE—Accuracies heretofore impossible are now obtained by the Pneumatron!

MONEY SAVING — Eliminates over-weight give-away, saving thousands of dollars per year.

DURABLE—This is not a complex electronic or laboratory type piece of apparatus but is practical, easy to understand and sturdily constructed. The weighing assembly, entirely enclosed in a dust-tight case, will withstand considerable abuse without affecting its accuracy.

That's it—briefly. For complete details send for Bulletin 122. PNEUMATIC SCALE CORPORATION, LTD., 91 Newport Avenue, Quincy 71, Mass. *Also: New York; Chicago; San Francisco; Los Angeles; Seattle; Leeds, England.*

PNEUMATIC *Packaging and Bottling Equipment*

SOLUBLE COFFEE is packaged in colorful foil packets that are machine formed, filled and sealed at speeds of over 700 per min. Packets hold one serving. They're put up in attractive display-type cartons.

One-Portion Packets Gaining

Inexpensive, attractive small packages formed from special materials, then filled, sealed by high-speed machines . . . Packaging of 2-in-1 salt-pepper packet is detailed

FE STAFF

Where's the limit to what can be done with packet-type packaging? Actually, the sky's the limit.

Long familiar in the food industry as a novelty form of packaging, it's now catching on and gaining serious recognition as a staple technique.

But food processors are not being stampeded into it. They're giving a long, hard look at all factors involved in packet-style packaging.

Biggest strides really took place within the last three years. Chief reason: Suppliers have been coming out with more and more exceptionally good materials for the industry to work with.

These advanced materials have opened up new fields. Consider what's been done with them since 1950. They've gone into the packet-packaging of fats, liquids, syrups, and other viscous materials. And they've even been adopted for gas- or vacuum-packing as well as hot-filling of foods.

Tracing the Trend

The food "packeting" trend harks back to the original single-service portions of powdered sugar for restaurants and the institutional trade some 20 years ago.

More recently it spread out to include soluble coffee, syrups, jams, jellies, French dressing, soy sauce, dried milk, baking powder, instant cocoa, seasonings, soup mixes, dried yeast, flavored mixes, and a dehydrated cream product.

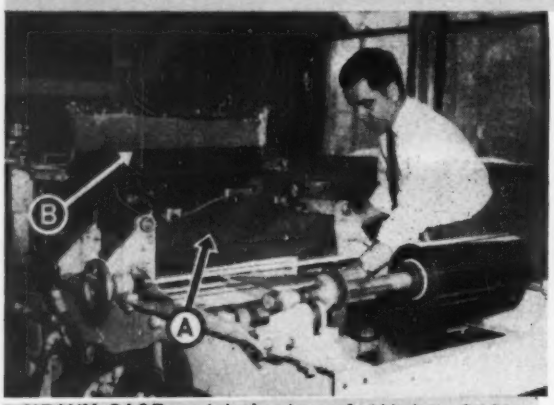
Now being neatly compartment-packed on the same strip of material are salt and pepper and also salt, pepper, sugar, gum, and toothpicks.

Soon to appear will be a 3-in-1 packet of soluble coffee, sugar, and dehydrated milk powder for a single-cup serving of coffee.

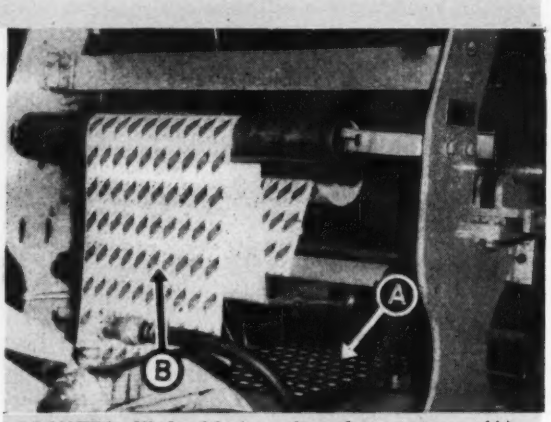
Other items packeted in portion-controlled units for consumer convenience are food colors and flavors, spices, uncooked cereals, dehydrated mashed potatoes, and confections. And small, single-service packets will edge in to snag still other foods now going into larger size jars and cartons.

Now to the factors behind the swing to small packets:

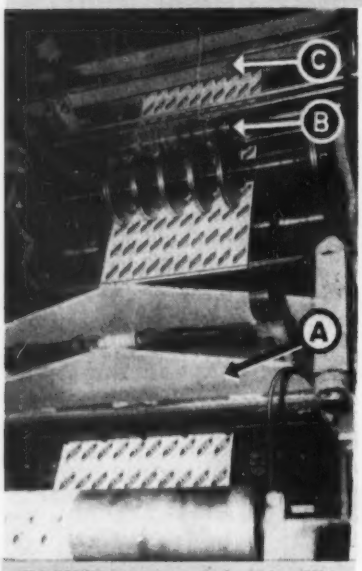
For one thing, there are ever-increasing numbers of heat-sealable films, foils, coated papers, and lamina-



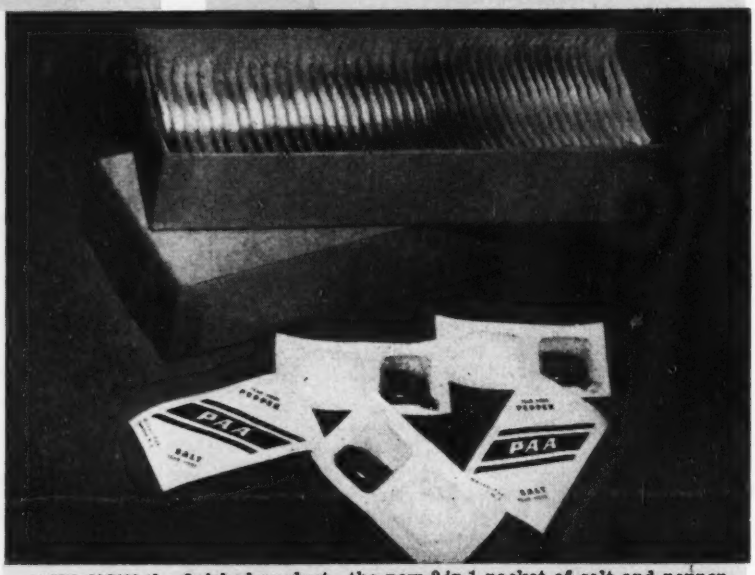
HEAVY GAGE acetate is stamped (A) into double row of ten pockets, which go under hoppers (B).



POCKETS, filled with 1g. salt and ¼g. pepper (A) receive heat-sealable top sheet (B).



PACKETS are sealed (A), slit by knives (B), and cross-cut (C).



AND NOW the finished product—the new 2-in-1 packet of salt and pepper featuring easy-opening, shaker-type device. They're cartoned in 50's.

tions with improved product-protecting properties, plus other sought-for characteristics designed to fulfill specific requirements. Significant has been the development of new laminating and coating techniques—both responsible for modified materials that are now being turned out economically and at high rate.

Further impetus is supplied by the new high-speed machines for handling a wide variety of these new materials. Most of these units automatically form, fill, and seal pockets into single-unit packets or in continuous strips. In some cases, speeds have skyrocketed to over 1,000 per min. Such rising line speeds have helped cut packeting costs. Filling, in some instances, has become more precise—to within 0.1 of a gram, for example.

Still another factor is the coming of the specially engineered machines that gas-pack or vacuum-pack foods to protect and extend their shelf-life. Other units are "machining" devices into the packets for easy package-opening and product-dispensing. One even shapes a packet into a small pitcher. Still others form series of pockets in a strip of material and alternately fill them with different products from a corresponding number of feed hoppers.

Wins Consumer's Favor

Yet another factor is the rapid gain in consumer acceptance—principally for reasons of economy, convenience, and attractiveness of package. Another thing: Mrs. Housewife likes the idea of accurate, pre-measured portions much more than the less accurate spoon-measuring of certain foods from jars or cartons.

Processors have three ways of getting into the field of packet-packaging small amounts of foods. They can make their own machines, purchase such equipment as is offered by equipment manufacturers, or let contract packagers handle their products.

One processor who's built a machine is Kraft Foods Co. The unit forms pockets from a special vinyl film and then fills them with ¼- or 1-oz. portions of jams or jellies. Other items packaged in this manner are honey, cranberry sauce, and table syrup.

Contract packagers have devised special machines to form "tailor-made" materials into attractive packets in the fastest and least expensive way. For example, Mason-Keller Corp.,

(*Turn to page 132*)

We're busy getting ready for the Packaging Exposition in Atlantic City the fifth of April.

You are cordially invited to visit with us there during the exposition . . . to sit down with us and talk over any packaging problems you may have.

We're hoping to see you . . . so, stop in, won't you?

Go first to the people who <u>are</u> first!

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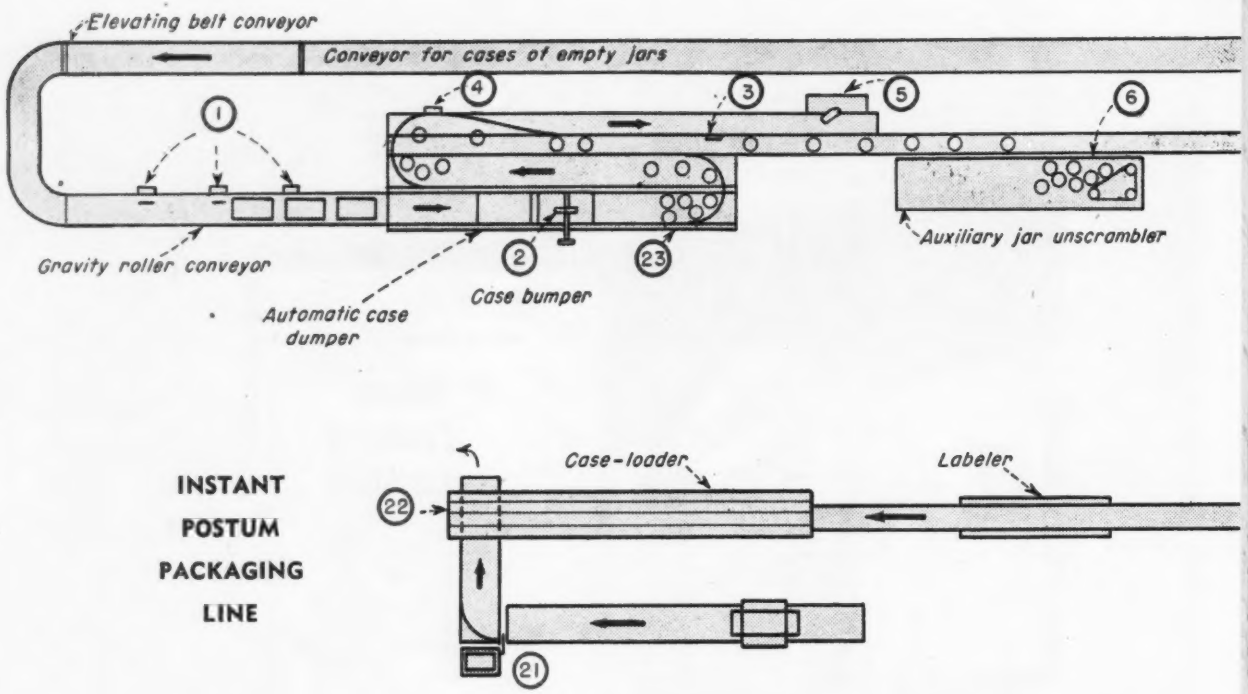
Use coupon on page 179.



SPOTTED HERE by red numbers are points where Post Cereals' ingenuity boosted line efficiency. These numbers key to explanatory details in accompanying text. Only omission is No. 24—not pinpointed because it covers overall line safety measures.

24 LOW-COST DEVICES

Since installing relatively inexpensive controls and inaugurating minor

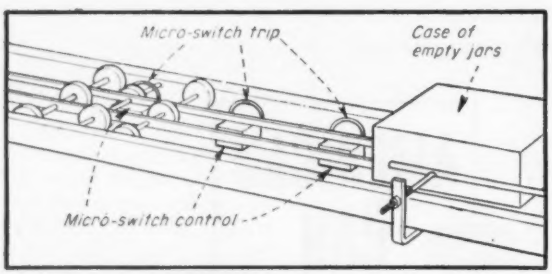
IVAN C. MILLER
Associate Editor, "Food Engineering"

Carefully planned application of micro-switches and other simple, inexpensive devices on your packaging line can chalk up these profitable gains:

- ▶ Less loss of containers and product
- ▶ More product protection
- ▶ Reduced down-time
- ▶ Minimized maintenance
- ▶ Concentration of worker effort where most advantageous.

Post Cereals Division of General Foods Corp., Battle Creek, Mich., has strikingly demonstrated the efficacy of such devices on its line where jars are filled with Instant Postum and capped.

This company's notable operational improvements are described below. Also, there is the story of how each one has helped in automatically safeguarding line operation. Location of each is indicated by number on the floor diagram above and described by number in text below.



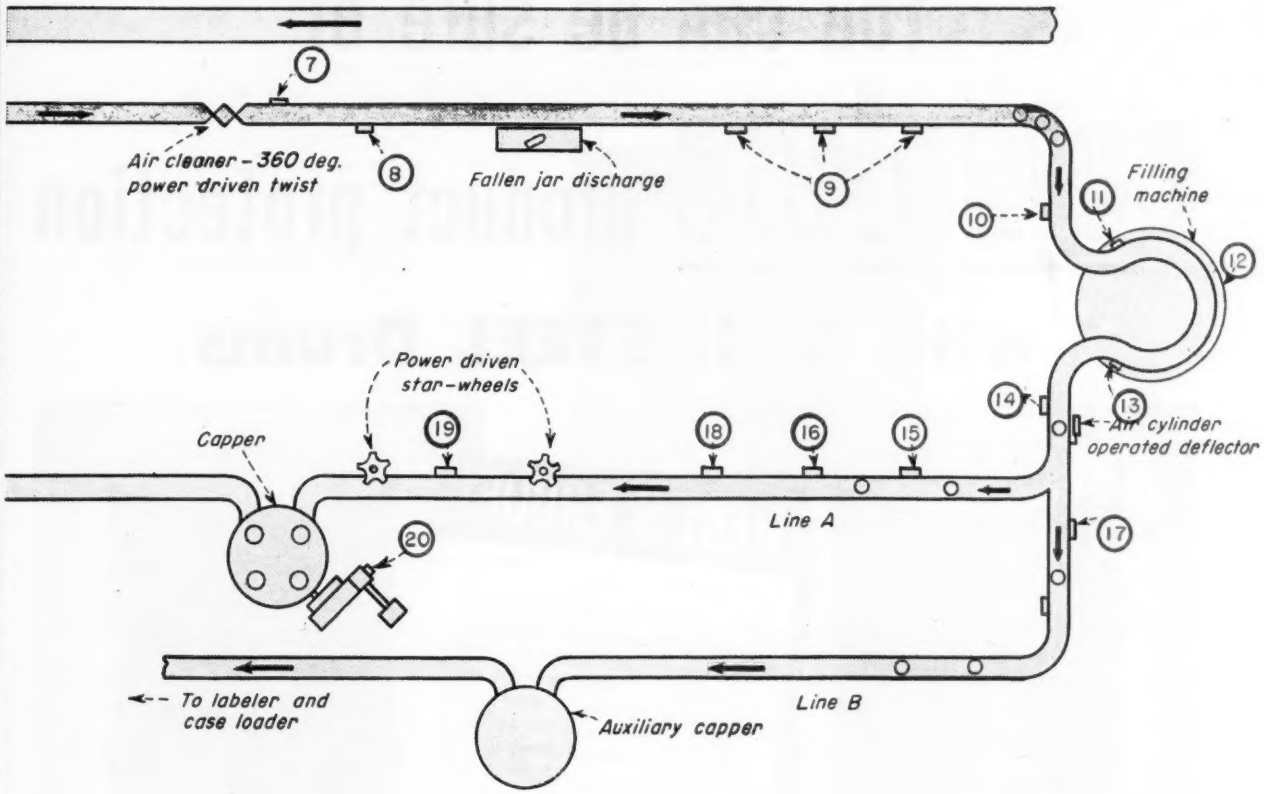
Prevents Case Pile-Up

1 Cases of empty jars are transported and elevated by belt conveyor to feed by gravity down a roller conveyor into the automatic case unloader. Should too many cases accumulate on the gravity feed, efficient operation of case-emptying unit would be impaired.

Number of cases that can stack up on the feed conveyor is, therefore limited by three micro-switch controls attached beneath the conveyor and actuated by brass wire loops that extend above the height of the rollers.

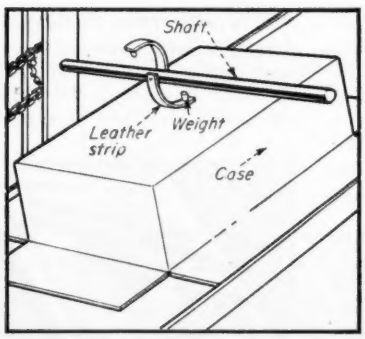
When any pair of these switches is actuated, the motor of the conveyor supplying the gravity feed conveyor is stopped. In order that a single case will not operate the controls, the space between each pair is made greater than the length of the case. However, whenever cases back up on th feed conveyor and before overloading is reached, two switches are actuated.

The third control is an extra safety measure. Should any one of the three fail, the other two adequately control conveyor overload.



Automate Package Line

changes, efficiency of jar-filling and capping line is greatly improved

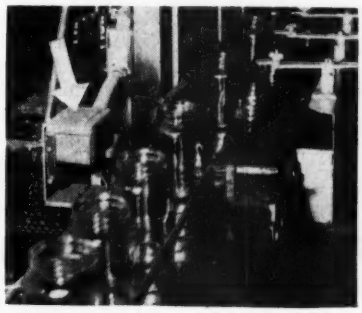


Removes Wedged Jars

2 Due to the slanted position of the containers during case unloading and also because of the snug fit between the dividers and the empty glass jars, some jars occasionally fail to slide out of the case.

To speed emptying case and aid removal of wedged jars, a shaft, chain-driven from a drive shaft of the unloader, was installed. This mechanism is elevated a few inches above the case at the jar discharge area (see sketch).

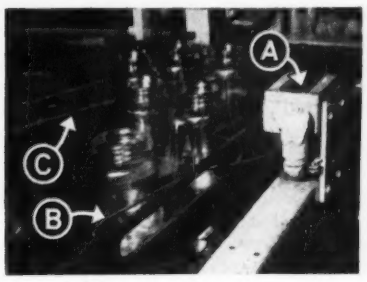
To the shaft were attached two leather straps, approximately 6 in. long with small weights bolted to their ends. As cases pass beneath these, weight-backed straps pound on the case sufficiently to loosen the jars but not enough to injure the case.



Avoids Conveyor Over-load

3 Discharged from the cases, the upright jars are transferred to an unscrambler, from which they feed to the single-file conveyor system that serves the packaging line. But if this line should become overloaded, broken jars or damaged equipment might result.

When the line backs up to location (3), thus filling the space between buldged-out guide rails, a micro-switch trip-arm is actuated to stop the flow of jars from the case unloader.



Safety Device

4 Control at this location serves two functions. Microswitch (A) oper-

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HERE'S PROOF!
The drum at left is an ordinary drum. After exposure to a year's weather, it was badly rusted and corroded . . . rust actually appeared after only a week's exposure. The drum at right—a U. S. Steel Drum—showed no rust at all after exposure for a full year.

● When you ship in U. S. Steel Drums you can be sure your products will arrive at your customer's plant in the same excellent condition as when you shipped them . . . same color, same purity. Here's why:

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U. S. Steel Drums are rust-inhibited . . . by a tightly adherent phosphate coating. This means that attack by rust and corrosion is inhibited at all potential danger spots.

The long-lasting finish on U. S. Steel Drums makes an especially desirable surface to decorate with your advertising message using a wide variety of bright, contrasting colors.

• • •

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USS

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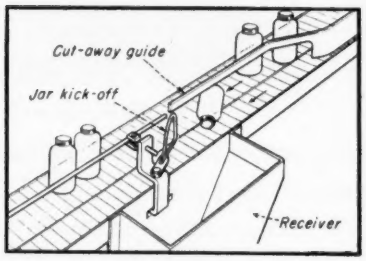
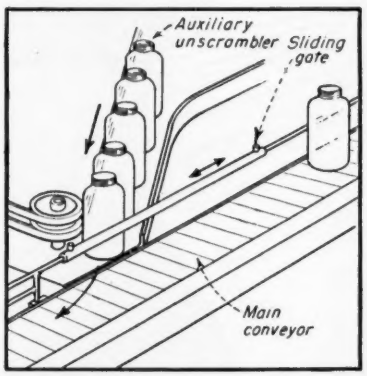
ated by feeler (B) serves as a safeguard in the event of failure of control (3), which would permit backup of jars to switch (4) location. Also, if congestion occurs in the case unloader, this latter control becomes operative to stop case unloader motor.

To reduce congestion due to friction between jars and control guide rail, a brass rod (C) was welded to the inside of the curve, thus minimizing surface contact and friction.



Fallen Jar Kick-off

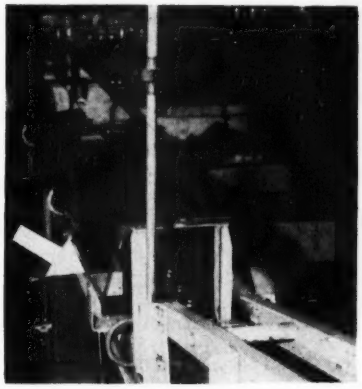
5 To prevent further progression of fallen jars, a special guide rail is employed. Lower portion of this guide is cut away, so that while upright jars are deflected to one side of the conveyor, fallen jars pass through the cut-away portion and continue in a straight line until they contact a second deflector, which sweeps them into a fallen jar receiver.



Extra Jar Supply

6 Provided is an auxiliary branch unscrambler holding a considerable supply of jars. Thus there is a stand-by back-log of jars that may easily be fed onto the line in the event of temporary stoppage of case unloader or failure of supply of cases to this latter unit. Thus avoided are interruptions in filling and closing operations.

At such times as necessary, the auxiliary unscrambler is started and the gate to the main conveyor opened. Though efficient, this gate is of simple design. It consists of a length of pipe with inside diameter to fit over the guide rail on both sides of the opening, telescoping on one to open a passageway. When the gate is closed the pipe functions as part of the guide-rail system.



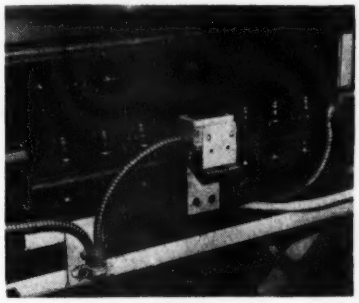
No Breakage Here

7 Jars next enter a 360-deg. power-driven twist and are air-blasted for dust removal. Should jars on the fast-moving conveyor ahead back up against the jars in the twist, container breakage would be certain—were it not for a micro-switch control located immediately beyond the twist.

At any time jars back up to this location, the control is actuated to stop the twist drive.

Limits Stop-Start

8 The motor that drives the conveyor mechanism through the twist is *not* again started the instant the container that actuated the control (7) has moved on. To prevent too frequent stop-start operation of the twist mechanism, a time delay is established by placing the twist drive starter control at location (8) well ahead of stop control (7).



Detects Jar Absence

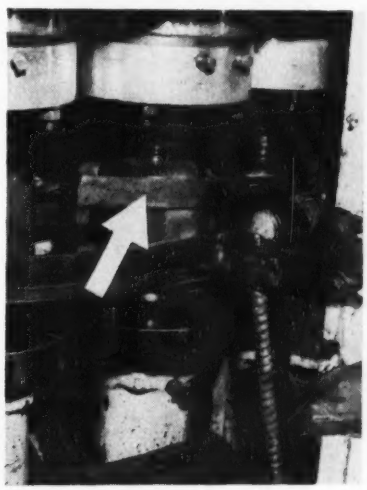
9 Next, three safety switches are placed along the conveyor to detect any absence of jars that is sufficient to threaten filling machine operation. In the event of a break in the line of jars between all controls, the three are actuated to stop the filling machine. While any of these controls will stop the filler when actuated, all three are needed to again start the filling machine. Thus avoided is unnecessary intermittent stopping and starting of the filler.

A jar lying on its side would have no effect on these controls. Therefore, a fallen jar discharge is placed immediately before these three safety devices to remove any toppled containers before they reach the micro-switch actuating arms.

Down Jars Spotted

10 Now should a jar on its side pass the safety controls, or topple after leaving the area, it would be smashed in the filler. Therefore, a fallen jar detector is located immediately in advance of the filling machine. When a jar on its side is detected, this control stops the filling machine motor, which then can be started only by manual control and after the fallen jar has been removed.

Not only does this control detect a jar on its side, but it also detects absence of a jar. Therefore, should the three safety controls at (9) fail to detect a break in the line or the line's end, control at location (10) will stop the filler.



Protects Filler

11 After jars have been star-wheel-positioned on the "stools" of the filler they immediately pass by a spring-lever actuated control. A jar in place holds control inoperative. No jar, or one broken, permits control to be actuated to immediately stop the filler. Machine must be started manually after placing a jar properly on the vacant stool.

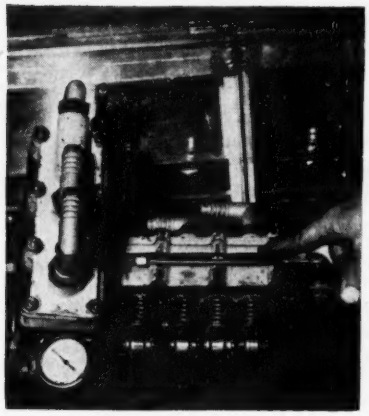
WE HAD LONG BEEN FASCINATED BY THE IDEA

. . . of putting the amazing story of starches between the covers of a single book. We realized that such a book would be a tremendous undertaking. The endless variety of starches, the ways they are produced, the creation of new specialty starches, the miracle of 'man-made' starch derivatives, the handling of starches—even these few subjects, covered in full, would make a large volume.

A steady flow of requests for information about starches finally prompted us to take a first step with a 56 page, semi-technical booklet. We have painted in broad strokes a panoramic picture of starches—their properties, production, application and handling.

We have included information of value to chemists and other technically trained people, in a way that will also be interesting to non-technical readers. Chemists, students, plant personnel, commercial management and all others who are interested in starches will find in this booklet something of value.

You may obtain a copy of "The Story of Starches," without obligation, by writing to: National Starch Products Inc., 270 Madison Ave., New York 16, N. Y.



Gage Warns of Leak

12 There is an access door at this location which makes it possible to observe the gages that indicate whether or not the valves controlling vacuum pulsation are working properly.

Since the product is hygroscopic and becomes sticky when moist, in time it will freeze the action of either of the sleeve mechanism it reaches. The product is kept from this valve mechanism by a rubber diaphragm, which tends to become ineffective after periods of operation.

If this should happen and the situation not detected within a reasonable length of time, complete failure of the valve mechanism would occur and costly replacements would be necessary.

For immediate detection of this condition, the aforementioned vacuum gages were installed. These permit loss of vacuum to be spotted and valves to be removed and repaired before complete failure occurs.

Prevents Damage to Filler

13 Lifting and lowering pedestals or stools on which jars are filled involves the use of air pressure. When a jar stool fails to lower after the filling cycle is completed, star wheels and other indexing mechanisms will be ripped away. In this event equipment replacement is very expensive and time-consuming.

Should a stool fail to lower at the required position in the cycle, the stool lift-roller contacts the trip of a micro-switch. When this control is made operative the filling machine is instantly stopped.

As mentioned, the filling machine can be stopped by several controls prior to arrival of jars at the point of filling. Therefore, though manual pushbutton operation is required to start the filler when stopped by stool level control, there was no way to indicate to the operator that the machine stoppage was caused by the failure of a stool to lower into position.

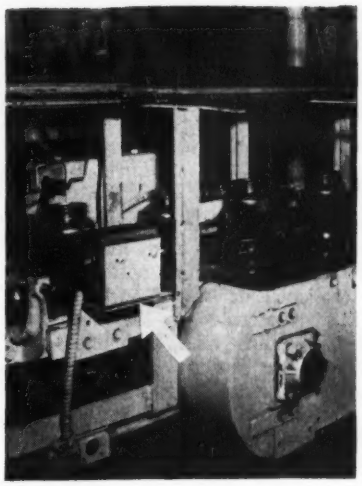
Also there was no guarantee that the frozen stool unit would be removed for repair before the filling machine was again started—that is, not until an added safety device was installed.

Now, whenever the micro-switch is trippled by the assembly of a stool that has failed to lower, an intricate company engineered mechanism locks the micro in tripped position, thus making the pushbutton start of the filler impossible.

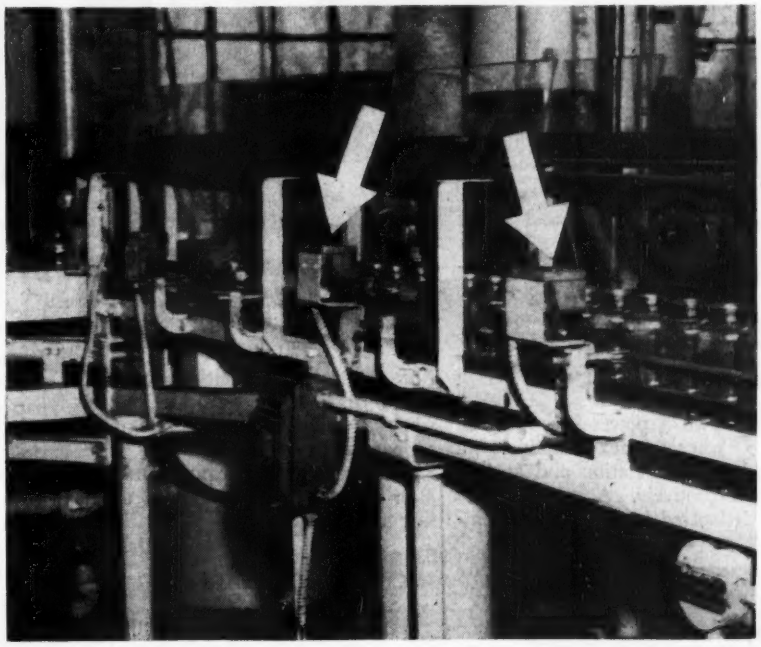
A packaging line mechanic must be summoned to remove the damaged and threatening stool assembly before disengaging the micro-switch locking mechanism.

Controls Congestion

14 Should congestion occur in the line delivering jars from the filler, thus backing up containers against those advanced by the power driven filling machine discharge star wheel, extensive jar breakage and product loss would result.



Any damage from this condition is prevented, however, by action of a micro-switch operated from a bulged-out guide-rail. So long as jar travel is free, the trip on the bulged-out rail is not contacted. Congestion forces jars against the rail to actuate the control and stop the filler until the congestion is relieved. (Photo above.)



Automatic 2-line Feed

15-16 Speed of the filling machine exceeds capacity of one jar capper, therefore a second auxiliary capper is provided. Feed from the filler divides to give full capacity supply of jars to the primary capper and to divert the excess to the auxiliary assembly.

This is how the feed to each capping assembly is automatically controlled by micros and guide switch.

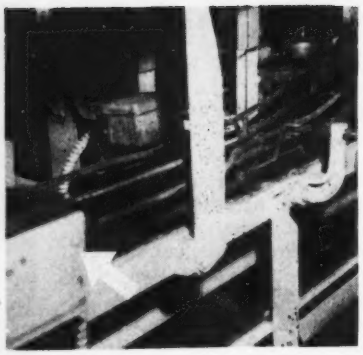
Two micro-switches (15) (16) are installed on Line A that feeds the primary capper (see flowsheet). Presence of a jar bearing on the trip of each control when the line is filled makes both operative. Closing of both circuits swings an air-cylinder operated deflector guide-rail, to divert jars to Line B, which feeds the auxiliary capper.

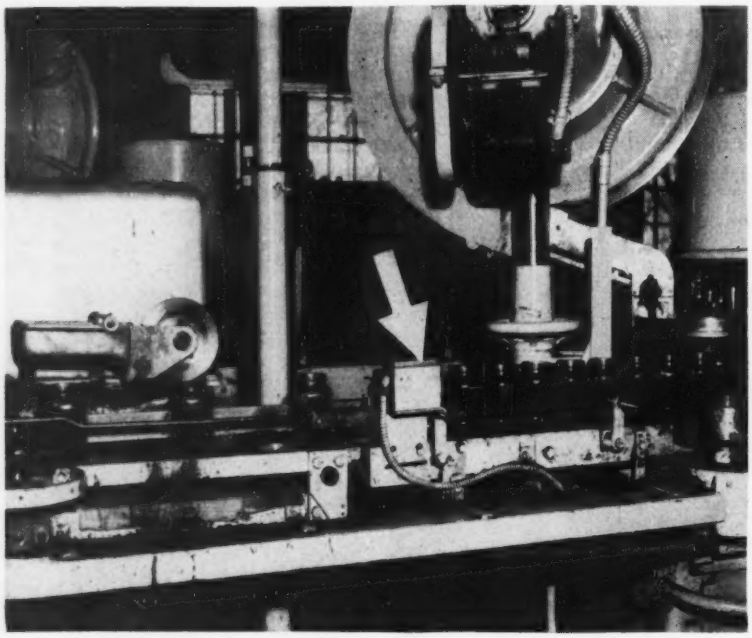
When the string of jars on Line A

passes the second micro-switch (16), the deflector is again operated to direct flow of containers to the primary capper.

Crowding Stops Lines →

17 Installed on Line B beyond the deflector is a safeguard control that operates in conjunction with the control (15) on Line A. When both micro-trips are actuated by the presence of a jar against each, both lines are filled to safe capacity. In combination, these controls then stop the filling machine. Start of the filler motor is automatic when one of the lines is again free at the control station.





Wheels Can't Smash Jars

18-19 Two power-driven star wheels index containers at the jar lip gluing station and at the capper, respectively. A micro-switch control is located in advance of each. Both controls detect either down jars or "no jars" to stop the capper and star wheels, which are driven from the capper motor.

The starting up is manual, but only after the down jar is removed or the line again filled.

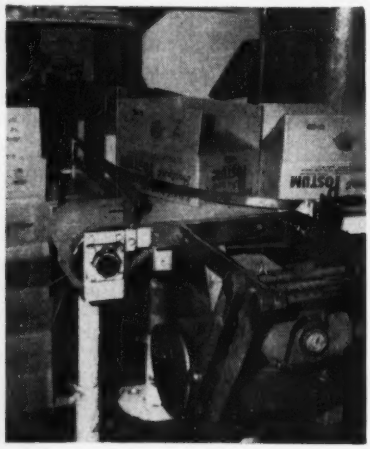
←Controls Cap Feed

20 Two devices provide improved control over cap delivery. Closures are discharged onto a belt that deposits the caps in controlled amount into a reservoir feeding the indexing mechanism. Latter unit feeds positioned closures to the capper.

If caps are supplied in over-abundance, distortion of caps may result. This is prevented by a micro-switch control.

Side of the feed reservoir opposite feed belt is hinged. As caps are emptied from the belt of the feed conveyor into the hopper, a pre-determined accumulation of caps presses against the hinged plate, swinging it against the trip of a micro-switch. When actuated, this control stops the motor driving the cap feed conveyor. The flow of caps from the inclined bottom of the reservoir permits the hinged plate to swing back, thus energizing the micro-switch to restart the feed conveyor.

Drive of the feed conveyor is reversible. Thereby gained is a time-saving advantage. When a change in the size of caps is required, reversing the direction of the belt rapidly empties the feed system of caps. Otherwise it would be necessary to clear them slowly through the capper



Case Indexer

21 Containers of two sizes are filled and capped on these lines. Therefore case size varies—also filling pattern at the case-loading station. As a result cases of one size must arrive at the case-loading station with the narrow dimensions in the direction of travel, the other with the wide dimensions approaching the loader.

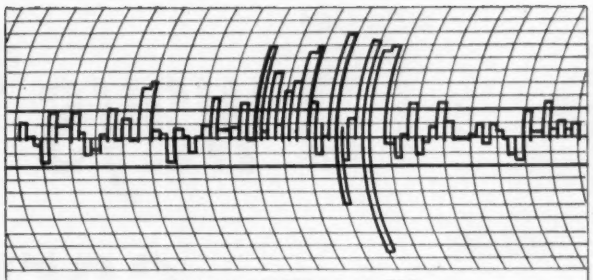
Either type case is delivered to the casing machine properly indexed by automatic company engineered devices. As cases approach the case-loading station, a right-angle transfer is made from one conveyor to another. Cases of one size are directed by curved guide-rail to swing at the transfer without changing relative position.

When the other size is to be loaded, rail is removed to permit a case to come to a halt at the end of the first conveyor. Then a cam-operated pusher, timed automatically, lifts and shoves the case into the loader feed conveyor, but in reverse travel position.

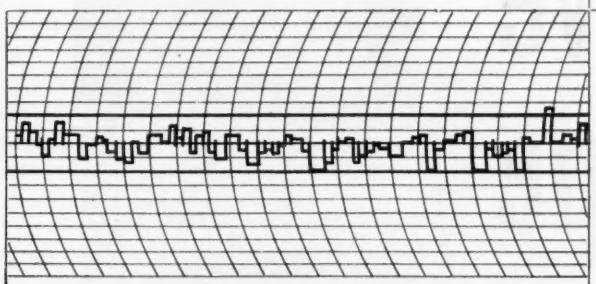
As one case arrives at the transfer position, the following case is held by

(*Turn to page 135*)

ARE YOUR PACKAGE WEIGHTS ACCURATE?



ORIGINAL DEGREE OF CONTROL



LATER DEGREE OF CONTROL

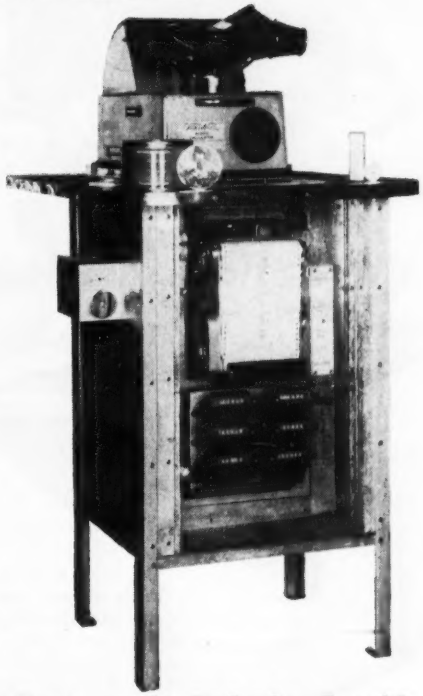
MAKE SURE WITH DATAMATIC CONTROL!

The two charts above illustrate graphically the result of installing a "Datamatic" Weight Calculator. They are typical of what the "Datamatic" will automatically do on ANY production line, using ANY checkweight scale.

The "Datamatic" automatically plots test weight graphs, calculates and registers sample lot averages, totalizes overweight and underweight amounts while registering units sampled. It produces all the records you need for statistical or simple weight control on single or multiple lines, using sampling inspection technique.

One "Datamatic" is being used for "Statistical Weight Control" (S.W.C.) on 14 production lines (same product). Another is being similarly used on 4 lines (one product) and 2 lines (2nd product). A 14 year old child could operate the "Datamatic" for S.W.C. on several production lines.

Upon request, we will set up and operate the "Datamatic" on your lines, on a trial basis. Arrangements for this can be made at the Packaging Exposition in Atlantic City at our Booth No. 1342. Circular matter promptly upon request.



See it at the Packaging Exposition at Booth 1342

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We'll set up a
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Use coupon on page 179.

75 ways to serve tape

Wide tapes, narrow tapes—any of more than 300 different pressure-sensitive tapes can be applied faster, easier by dispensers designed specially for the job. 75 different manual, automatic, and semi-automatic dispensers for "Scotch" Brand Tapes are now available—or our engineers will design one to fill your specific needs. For facts, write on your letterhead c/o Dept. FE-34.

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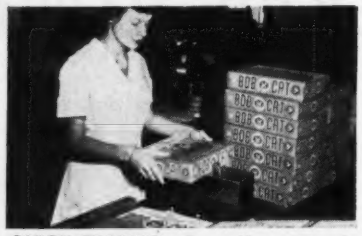
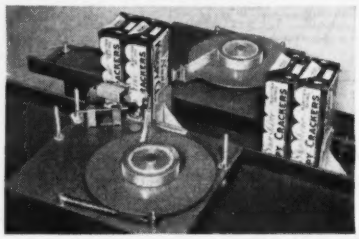
3M COMPANY

LOOK how dispensers can work for you!

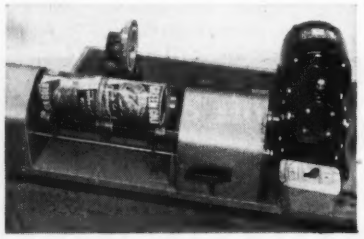


QUICK SEALING of small cartons is accomplished with this "Scotch" Brand Type M Box Sealer. Uses ¼" to ⅝" tape widths. Object to be sealed is merely passed over roller automatically applying 1½" strip of tape.



THE EASY WAY to handle multiple package units: *tape* them with this "Scotch" Brand S-69 Sealer. Uses ¼" to 1" tape widths. Applies predetermined lengths of tape to make 30 to 60 "deals" a minute.

CUT WASTAGE on hand operations with this "Scotch" Brand Definite Length Dispenser, Model M-92. Uses 1" or narrower tape widths. Predetermined length up to 4" is delivered in one lever stroke; repeat strokes deliver longer lengths. No guesswork; no waste!



DIFFICULT SHAPES are handled easily with the proper dispenser. This "Scotch" Brand Can Bundler can be used to seal covers on round containers, or to combine two or more cans end-to-end to form a combination "deal". Average speed: 20 units a minute.

IS THE CHARGE now being made by dairies for milk delivered in paper cartons justified?

PAPER vs. GLASS

"Costwise, Where Do the Decimal Points Really Fall?"

Assumption has been that cartons "run an extra cent a quart." But there's much more to it than that—as now revealed in a check of 8 Michigan dairies

CARL W. HALL
Agricultural Engineering Department,
Michigan State College, East Lansing, Mich.

Just *how much more* does it cost you, Mr. Dairyman, to merchandise milk in paper cartons than in glass bottles?

Is there justification in the frequent extra charge of 1¢ to the consumer for this type of package? In other words, Where do the decimal points really fall?

To obtain the answer, a time and motion analysis was made of filling operations (both paper and glass) in eight dairy plants located in central and southern Michigan.

Figuring Glass

The bottling operation is the key to all steps from storage tank to cold room, and one of the most expensive in milk processing. For this reason, selection of the proper size filler for present and future needs should receive special consideration. Fillers have been found to operate at less than 90% of rated capacity.

In the glass-filling operations, it was found that one man can inspect and case quart bottles at the rate of 63 per min., and ½-pts. at 99 per min. And he can case 80 qt. bottles per min. without inspecting them.

These are maximum speeds at which a person can be expected to perform without casing aids, when he has an adequate supply of bottles, cases positioned so bottles can be easily placed in them, and a foot trip provided for releasing the cases so they will be conveyed to the cooler.

If a filler is operating at 90 per minute, two men are required to inspect and case the bottles in an operation where only 1½ men should be needed.

It would be extremely difficult to utilize fully the work capacity of these two men by other productive labor unless another bottling machine was feeding onto the same table. Thus, the filler should be run at 60 bottles per minute for one man, or 120 for two.

Unit cost of a glass-filling operation, based on 90% of the milk in quarts with the remainder in ½ pts., is given in Fig. 1. Included are interest and depreciation on bottles and cases, cost of caps, labor and equipment expenses. Note that there is little difference in cost of the operation between different sizes of filler.

Bottle and Cap Costs

Since the bottle is the major item of cost, importance of increasing its life should be emphasized. Many dairies accomplish this by working together in recovering each other's bottles through an exchange. Employee should be educated and trained to handle bottles with care to lengthen their life.

A cost reduction of $0.05 per 100 lb. of milk can be realized by increasing the number of trips per bottle from 25 to 50. This saving is greater

than the total cost of such operations as clarifying, cooling, homogenizing, and heating milk in an internal tube unit.

Cost of the bottle cap is nearly as great as that of the bottle per trip. Many plants cap and hood bottles to prevent contaminating materials from collecting on the cap. In this case, it would seem logical to select a hood that would serve as a cap as well, thus eliminating one operation — because capping and hooding account for practically all the delays at the bottler. Bottles with small openings, manufactured at present with outside diameters as small as 38 mm., require less material for the cap and thus reduce its cost.

Labor cost, including cleaning, amounts to about ⅛ of the total operational cost. Since the filler is the final piece of equipment, and often the only one to touch the milk after pasteurization, it is very important that it be kept clean.

Daily cleaning time for 14- and 28-valve vacuum fillers was 1.05 and 1.19 hr., respectively, exclusive of cleaning between different products (about 5 min. each time). Changing from quarts to ½ pts., and vice versa, requires about 1½ min.

In the plants studied, ⅛th of the cleaning time was consumed in getting the hose and then rinsing the inside of the bowl. A hose located close to filler would greatly reduce this time.

Another item involved when comparing glass bottles with paper cartons is the cost of washing the bottles. Unit costs of operation of a soaker bottle washer and a case washer are shown in Fig. 2. Included are utilities, labor for removing empty bottles, broken bottles (4 per 1,000 qt.), and cost of storage space for bottles and cases.

In order to figure cost of the operation, it is necessary to add the unit costs for the bottling equipment and for the washing of those bottles. For 100 bpm. capacity, 80,000 lb. milk per day, $0.25 and $0.09 are the respective costs per 100 lb. for filling and washing glass bottles—a total of $0.34. The valley or low point on a particular curve indicates the most economical size of equipment for the operation being considered.

Paper Cartons

Carton fillers studied were of 20-65-per-min. capacities and operated at about 80% of rated capacities.

From data shown in Fig. 3, the cost of the paper carton forming and filling operations can be compared with the entire bottle filling and bottle washing operations shown in Figs. 1 and 2. For 65 cartons per min., 80,000 lb. per day, the paper carton machine routine costs about $0.90 per 100 lb. of milk. Included are $0.0001 for closing wire and $0.0025 for wax per qt. container.

This is approximately $0.65 more than the glass-filling operation, and $0.56 (about 1¾¢ per qt.) more than the entire glass operations. The higher cost is attributed to the fact that paper containers, whose initial cost is less than glass bottles, make only one trip. This having been realized by many dairies, it has often led to an extra charge of 1¢ per qt. for milk in the paper carton.

Cleaning time is practically the same for carton and glass fillers. The 65-per-min. machine requires 1.10 hr. per day for cleansing. This labor could be reduced by increasing ease of assembly and disassembly. Additional savings could be made by reducing the supervision necessary while the machine is operating—with present machines it is not so easy for the employee to simultaneously supervise the operations and case the cartons as it is with the glass filler.

Specific aids would be the placing of cartons and accessories close to the machine, and also installing conveyors at correct height so that the caser can quickly inspect the height of milk in the cartons.

The above feature has been designated Journal Article 1572 of the Michigan Agricultural Experiment Station, East Lansing, Mich.

Graphs Show What Each Operation Costs

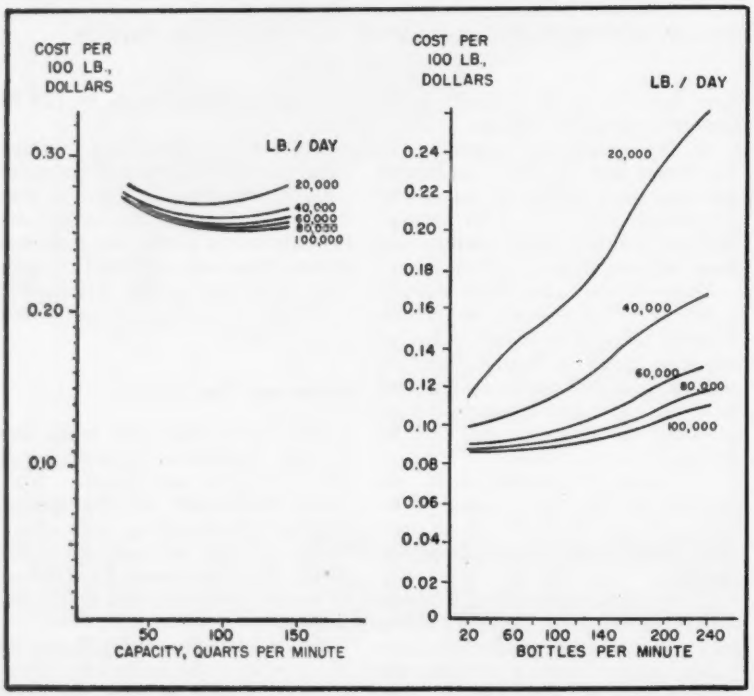


FIG. 1 & 2. Filling and capping glass bottles (left) and washing returned bottles and cases (right). Both based on 25 trips per bottle, 90% in quarts.

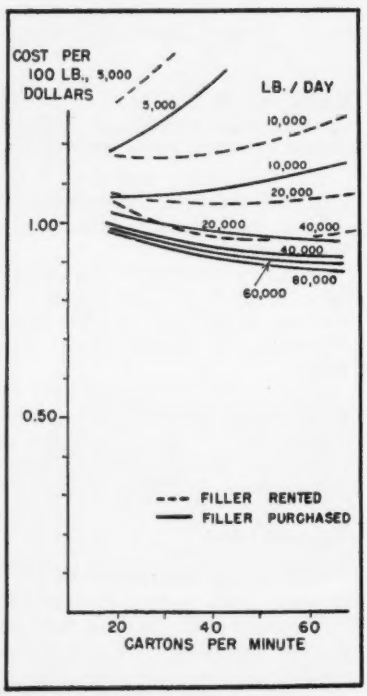
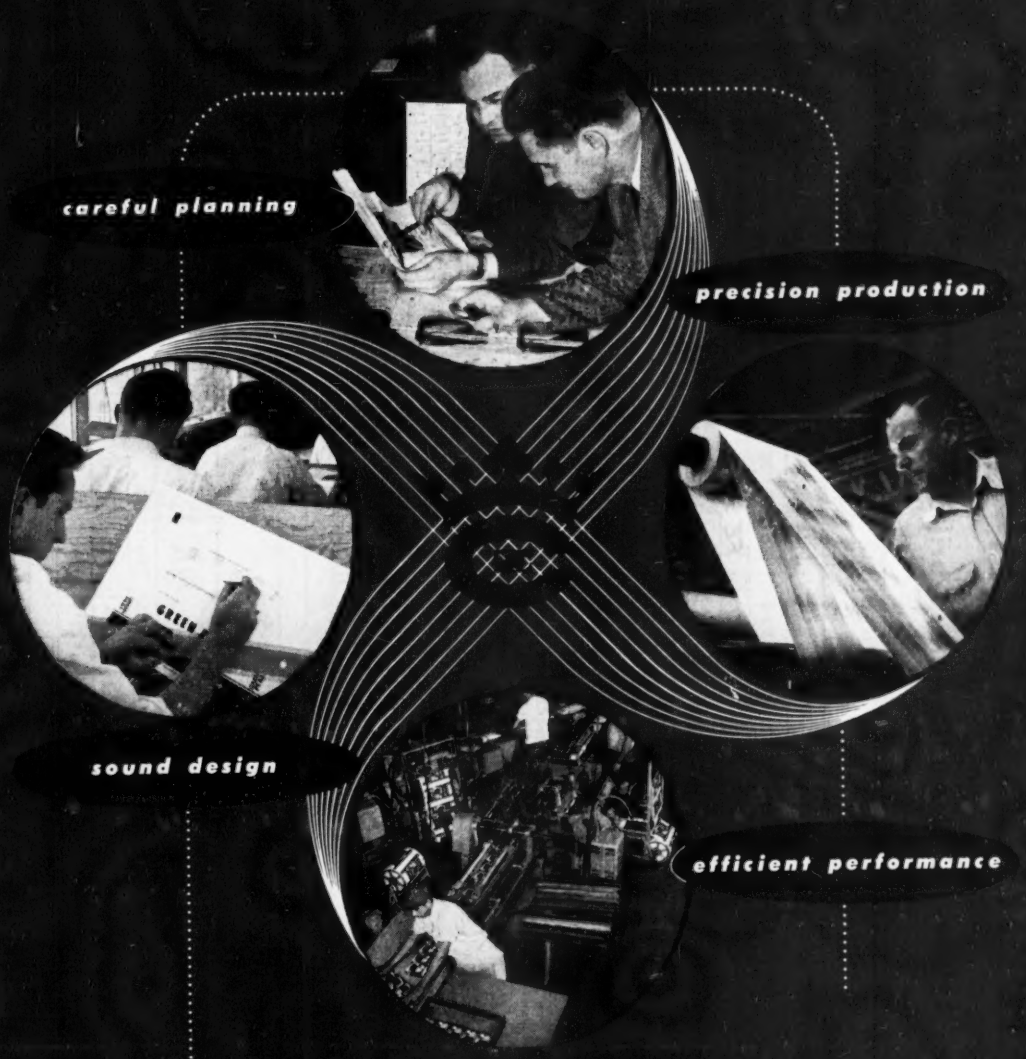


FIG. 3. Unit cost of paper filling operation, 90% in quarts.



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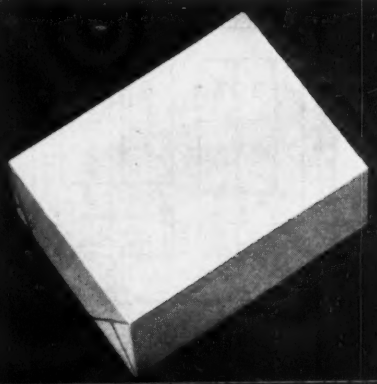

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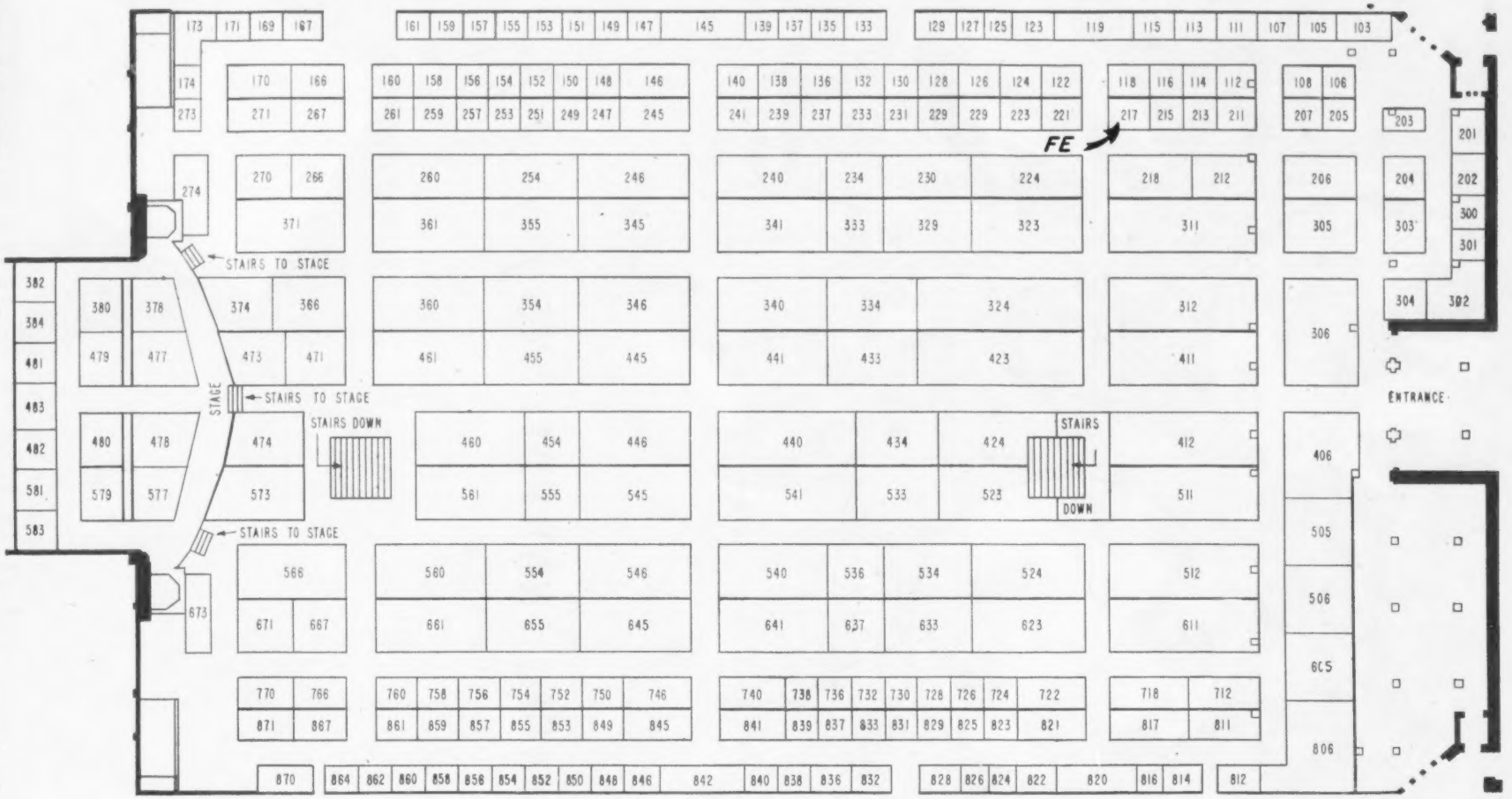


LIST OF EXHIBITORS

Companies and Booths (For Booths 901 *et seq*, See Basement Floor Plan, Next Spread)

—A

ABC Packaging Mach. Corp. . 732, 736
Acme Steel Co. 146
Addressograph-Multigraph Corp. 1127
Adjusto Equip. Co. 273
Alemite Div., Stewart-Warner Corp. 1149
Algene Marking Equip. Co. 160
Aluminum Corp. of America . . . 566
Aluminum Foils, Inc. 1232
American Can Co. 461
American Coating Mills Corp., Div. of Robert Gair Co. . . 506, 605, 806
American Excelsior Corp. 671
American Marking Corp. . 1335, 1337
American Partition Co. 1314
American Rondo Corp. 1340
American Type Founders 871
Ames Bag Co. 1523
Amsco Packaging Machy., Inc. 536, 540
Anderson Bros. Mfg. Co. 1301
The Arabol Mfg. Co. 455
Aravel Corp. 962
Arenco Mach. Co. 202
Armour & Co., Curled Hair Div. . 1414
Art Roll Leaf Stamp. Co. 1425
Arvey Corp. 122, 124
Askania Regulator Co. 1230
The Associated Cooperage Industries of America, Inc. 247
Atlas Plywood Corp. 1122
Automatic Web Control Mfg. Co. . 770
Avery Adhesive Label Corp. . 135, 137

—B

Bakelite Co., A Div. of Union Carbide & Carbon Corp. 412
Baker Industrial Truck Div. of the Baker Raulang Co. 1051
Bartelt Engineering Co. 1027
Battle Creek Bread Wrapping Mach. Co. 1105
Charles Beck Machine Corp. . 223, 225
Bemis Bro. Bag Co. 303
Bensing Bros. & Deeney 360
Better Packages, Inc. 234
Big Joe Mfg. Co. 1130
Biner-Ellison Machy. Co. 274
Bischoff Chem. Corp. 1334
E. L. Bivans, Inc. 633
The Borden Co., Chemical Div. . . 1117
Bostitch Inc. 655
Bradley Container Corp. 909
Brown Bag-Filling Mach. Co., Inc. 260
Brown Co. 861
F. N. Burt Co., Inc. 845
Burt Mach. Co. 850, 852

—C

C. I. T. Corp. 1034
Cameron Mach. Co. 1055
Cargo Packers Special Products Co. 170
Celanese Corp. of America 445
Celluplastic Corp. 1207
The Celon Co. 825
Celotex Corp. 1004
Central States Paper & Bag Co., Inc. 237
Ralph Chaffee & Co. 301
Chain Belt Co. of Milwaukee 1226
Champlain Co., Inc. 206
Chase Bag Co. 478
Chase Equip. Corp. 870
The Chaspec Mfg. Co. 460
Chester Packaging Products Corp. 925, 927
Chippewa Paper Products Co. Inc. 166
Chisholm-Ryder Co. of Pennsylvania 822, 824
The Clark-Aiken Co. 1354, 1348
Clark Equip. Co. 1150
The Cleveland Container Co. 333
Arthur Colton Co. 1012
Consolidated Packaging Machy. Corp. 266
Container Equip. Corp. 119
Continental Can Co., Inc. . . 512, 611
Counsel Mach. Co. Inc. 581, 583
Craig Mach., Inc. 1408
Crown Cork & Seal Co. 270, 371
S. Curtis & Son Inc. 904
Cushion Pack Inc. 1054

—D

Daher Co. (Holland Box Div.) . . 1322
Dennison Mfg. Co. 842
Dependable Compressor & Mach. Co. 1213
Derby Sealers, Inc. 106, 108
Dewey & Almy Chem. Co. 1253
Diagraph-Bradley Industries, Inc. 718
Diaphane Corp. 128
Dispense-A-Label Devices 1558
Dixie Wax Paper Corp. 1441
Dobeckmun Co. 533
Doughboy Industries, Inc. 667
The Dow Chem. Co. 560
Dumatic Industries 111
E. I. Du Pont de Nemours & Co., Inc.
Film Dept. 423
Kinetic Chemicals Dept. 334
Polychemicals Dept. 324
Durethene Corp. 1223
John Dusenbery Co., Inc. 1109

—E

Eagle Chem. Co., Inc. 1212
Eastman Chem. Products, Inc. . . 554
Eastern Duo-Fast Corp. 1249
Eastman Kodak Co. 546
Economic Machy. Co., Div. of Geo. J. Meyer Mfg. Co. 355
Electronic Mach. Parts, Inc. 816
Ekco Prod. Co., Ekco Foil Division 912
Elgin Mfg. Co. 253
Envelope Manufacturers Assn. of America 107
The Exact Weight Scale Co. 328

—F

Federal Adhesives Corp 1239
Federal Tool Corp. 133
Felins Tying Mach. Corp. 174
Ferguson Machine and Tool Co. . 1217
J. L. Ferguson Co. 205, 207
Fibre Drum Manufacturers Association 139
F. G. Findley Co. 1157
Dave Fischbein Co. 826
Flexi-Sales, Inc. 1358
FOOD ENGINEERING 217
Food Field Reporter—Drug Trade News 149
Food Machy. & Chem. Corp. 536, 540, 541
Food Mach. & Chem. Corp., Canning Machy. Divisions 541
H. B. Fuller Co. 1008
Fulton Bag & Cotton Mills 147

—G

Gaylord Cont. Corp. 573
General Box Co. 746
General Electric Co., Apparatus Sales Div. 1220, 1222
Geveke & Co. Inc. 1022
The Gilman Bros. Co. 1557
The Glassine & Greaseproof Manufacturers Assn. 132, 136, 138, 140
Globe Heat-Seal, Inc. Heat Seal-It Div. 241

Turn Page For Basement Floor Plan

B. F. Goodrich Chem. Co..1035, 1041
The Goodyear Tire & Rubber Co., Inc. 446
Gordon Cartons, Inc..... 833
Adolph Gottscho, Inc..... 224
Gravure Cylinder Corp.....1225
Great Lakes Stamp & Mfg. Co. Inc. 1349
Greenwood Packaging Supply Co.1454
B. F. Gump Co.....155, 157
Ferdinand Gutmann & Co..... 114

—H

Hamer Mach. Co..... 959
Hampton Mfg. Co. (Industrial Tape Div.) 1042
Hankins Cont. Co.....855, 857
Harcord Mfg. Co., Inc.....1218B
Hayssen Mfg. Co.....230
Hazel-Atlas Glass Co.....661
H. H. Heinrich Co..... 561
F. R. Hesser Maschinenfabrisk A. G. 1022
The John Hewson Co.....1115
High Production Mach. Co., Inc. 267, 271
Hilker Products Corp.....1013
The Hinde & Dauch Paper Co... 433
Hobbs Mfg. Co.....1147
Alfred Hofmann & Co.....1031
Hol-Bag Inc. 811, 812, 817
Hope Mach. Co..... 123
Horix Mfg. Co..... 304
Hudson Sharp Mach. Co..... 306

—I

I. D. Co. Fancy Cont. Division... 730
Ideal Stencil Mach. Co..... 129
Imco Cont. Corp.....1426
Intaglio Service Corp.....1233
Interchemical Corp., Printing Ink Div. 524
International Paper Box Mach. Co. 1134, 1140
International Paper Co.....1135 1137, 1141, 1145
International Staple & Mach. Co. 820
Irwin Corp. 1422
Island Equip. Corp. 116, 118
The Ivers-Lee Co..... 867

—J

Jiffy Mfg. Co..... 242
R. A. Jones & Co., Inc..... 545

—K

Kalamazoo Vegetable Parch. Co.. 471
Paul L. Karstrom Co..... 823
Kidder Press Co., Inc..... 257
The Karl Kiefer Mach. Co..... 832 836, 838
Kimberly-Clark Corp.....213, 215
Kingsbury & Davis Mach. Co.... 541
Kleen-Stick Products, Inc.....1316
Kliklok Corp. 1327, 1323
Frederick A. Krause Associates, Inc. 856, 858
Kurhan Co., Inc..... 935

—L

The Lakso Co..... 814
Lassiter Corp., New York Div., Inc. 148, 150
Lederle Lab. Div., American Cyanamid Co. 1353
Leiman Bros., Inc.....1440
Le Page's, Inc.....1347
Lynch Corp. 340

—M

MRM Co., Inc. 204
Machine O'Matic, Inc..... 126
Manhattan Paste & Glue Co., Inc. 760
Marathon Corp. 505
Mark'Andy, Inc. 1448
Marken Mach. Co.....474
Marsh Stencil Mach. Co.....221
Massachusetts Plastic Corp.....960
McKay Davis Chem. Corp.....1024
McLaurin-Jones Co. 1442
Mehl Mfg. Co.....1240
Melrose Packaging 1241
Mercury Heat Sealing Equipment Co. 1209
Merit Displays 934
G.V.D. Meulen & Zn N. V..1427, 1526
Meyer-Clement, Inc. 1101
Meyercord Co. 1020
Mid-State Gummed Paper Co....841
Miller Wrapping & Sealing Mach. Co. 536, 540
Milprint Inc. 424
Minnesota Mining & Mfg. Co. 724, 726, 728
Modern Packaging 434
Monsanto Chemical Co.....312
Kenneth J. Moore & Co.....103
Mosstype Corp. 249, 251
The Multistamp Co.....127
Mutual Plastic Mold Co.....1214
Mystik Adhesive Products...151, 153

—N

Nashua Corp. 229, 231, 233
Nasko Machy. Corp.....171
National Adhesive Div. of National Starch Products Inc.....441
National Bundle Tyer Co.....1216
National Can Co.....577
National Cont. Corp.....374
National Equip. Co.....1258
National Laboratories & Mfg. Corp. 173
National Metal Edge Box Co.....454
National Paper Box Manufacturers Assn. 637
National Wooden Box Assn.....766
New Jersey Mach. Corp.....623

—O

Olin Cellophane Div. Ecusta Paper Corp. 1120
Oliver Mach. Co.....254
Oneida Paper Prod., Inc.....1502
Owens-Corning Fiberglas Corp..1153
Owens-Illinois Glass Co.....323

—P

Package Machy. Co.....311
Packaging Industries Limited Inc. 750, 752, 754, 756, 758
Packaging Parade 245
Packing & Shipping.....864
Pack-Rite Machines Div. of Techtmann Industries Inc.....712
Paisley Products, Inc.....212
Pak-Rapid Inc. 159, 161
Paper Converting Mach. Co....1234
Parfait Promotional Packaging Co. 1044
Penn Tape Savers.....1345
Permacel Tape Corp.....473
Peters Machy. Co.....738, 740
The Pfaudler Co.....203
Phoenix Industries, Inc.....1245
Pitney-Bowes, Inc. 1048, 1050
Plastics World 300
Plax Corp. 354
Pneumatic Scale Corp., Ltd.....218
Poly, Seal Corp.....1131
Popper & Sons, Inc.....1432, 1430
Post Mach. Co...968, 938, 939, 1038
Potdevin Mach. Co.....366
The Printing Machy. Co.....859

—R

Rainbow Ribbons & Fabrics, Inc..958
Rapids-Standard Co., Inc.....302
F. B. Redington Co.....305
Reeves Pulley Co.....167, 169
Resina Automatic Machy. Co., Inc. 579
Reynolds Metals Co.....440
Rheem Mfg. Co.....1453, 1449
Riegel Paper Corp.....406
Rogers Plastics Corp.....1330
Rossotti Lithograph Corp.....1338
Roto Bag Mach. Corp..811, 812, 817

—S

Scale Specialties & Systems.....1342
Scandia Mfg. Co.....511
Schooler Mfg. Co.....261
Schroeder Machines Corp.....477
Seal-Spout Corp. 201
Seamless Rubber Co.....1434
Shaw-Randall Co., Inc.....378
Shellmar Products Corp....512, 611
Shelton Mfg. Co., Inc.....905
Sherman Paper Products Corp...555
Shipping Management, Inc.....125
Sill Industries 1121
Simplex Packaging Machy...536, 540

Sinclair & Valentine Co. 1357
H. P. Smith Paper Co. 105
Specialty Automatic Mach. Co. 924, 926
Speedry Products, Inc. 1457
Standard-Knapp Div. of Emhart Mfg. Co. 346
Standard Packaging Corp. 1026, 1030
Stanford Engineering Co. 246
E. G. Staude Mfg. Co., Inc. . 156, 158
Stein-Hall & Co., Inc. 145
Stokes & Smith Co. 541
Stone Cont. Corp. 483
Sun Chem. Corp. 112, 211
Sutherland Paper Co. 361
Swift & Co. General Adhesive Product Dept. 846, 848
Sylvania Div., American Viscose Corp. 411

—T

James Thompson & Co., Inc. . . . 1332
Toledo Scale Co. 1123
Tompkins Label Service. 673
Transparent Wrap Mach. Corp. . . 240
Traver Corp. 1231
The Trescott Co., Inc. 130
Triangle Package Machy. Co. 722
Tri-State Plastic Molding Co. Inc. 1107
C. E. Twombly Co. 239

—U

Union Bag & Paper Corp. 345
Union Paste Co. 1157
Union Steel Products Co. 534
United Can Co., Inc. 1246, 1248
U.S. Automatic Box Machy. Co., Inc. 329
United States Bottlers Machinery Co. 262
U.S. Engineering Co. 113, 115
U.S. Printing & Lithographing Co. 641

—V

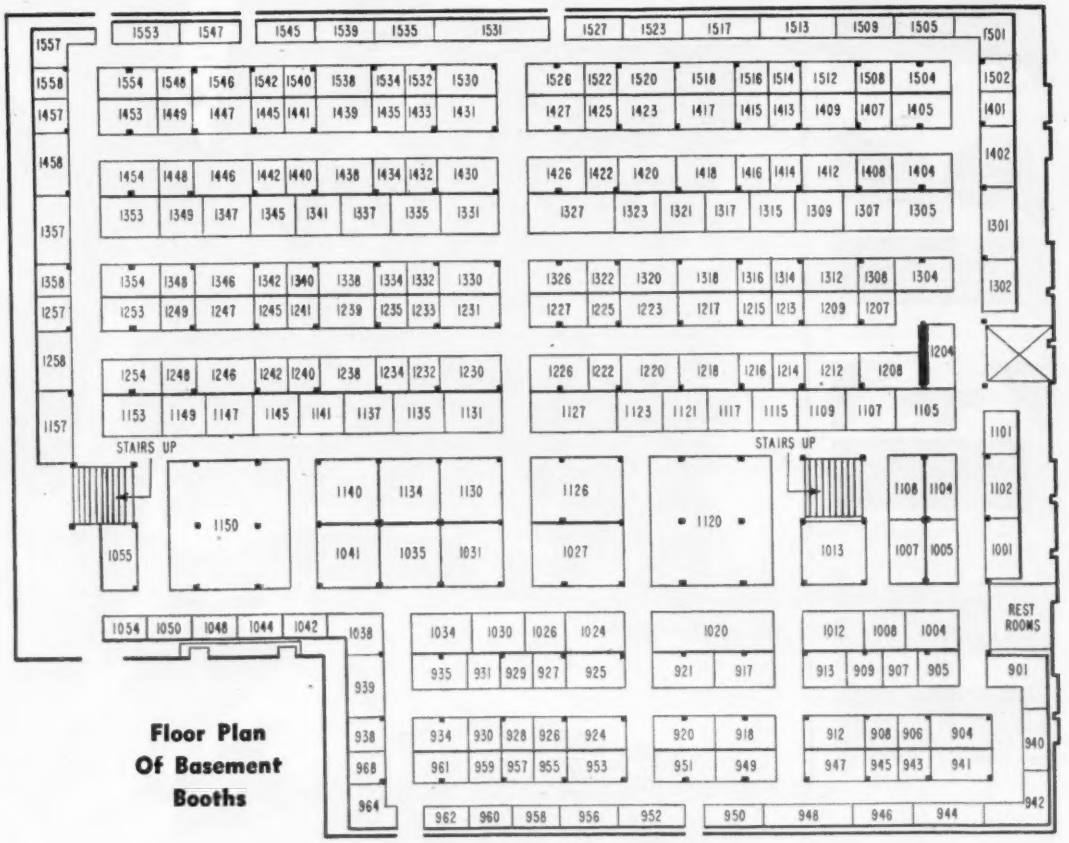
Vac-Tie Fasteners, Inc. 154
The Varigraph Co., Inc. 1215
Veeder-Root Inc. 1445
Vertrod Corp. 840
The Visking Corp. 523
Vulcan Electric Co. 1308

—W

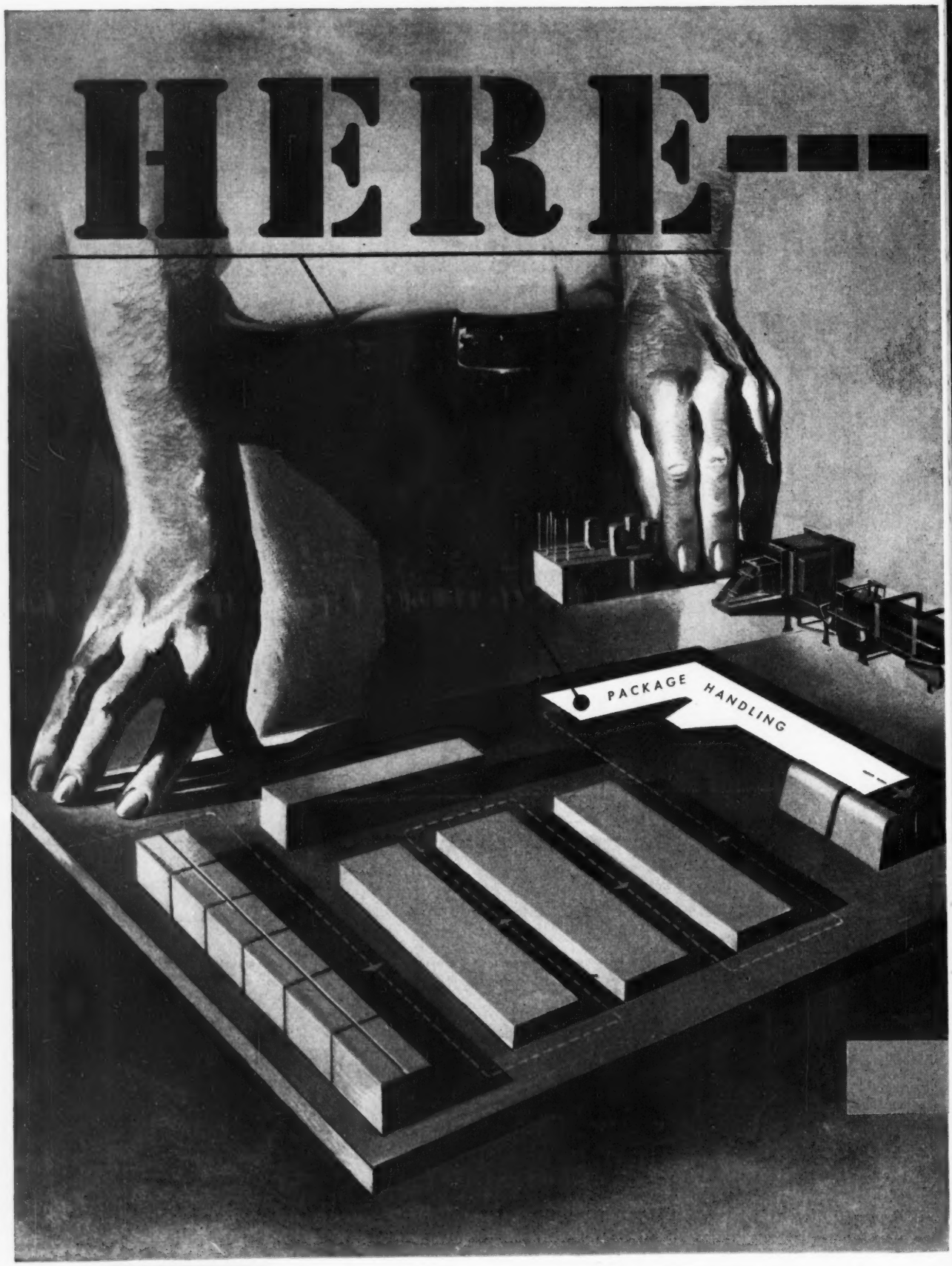
Walton Laboratories 913
Warner Electric Brake & Clutch Co. 1227
Weber Addressing Mach. Co. 854
H. G. Weber & Co., Inc. 821
Weigh Right Automatic Scale Co. 831, 829
The West Co., Inc. 1257
Frank W. Winne & Son, Inc. 849, 853
Wolverine Paper Converting Machy. Corp. 171
Wood Conversion Co. 259
The Woodman Co., Inc. 645
Wrap-Ade Mach. Co., Inc. 261
Wrap-King Corp. 862, 860
Wright Machy. Co. 341

—Y

The Yale & Towne Mfg. Co. . . . 1126
York Tape Printers Inc. 1235



Floor Plan Of Basement Booths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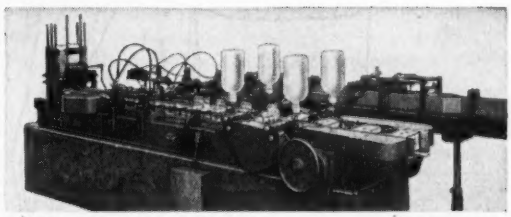
EMPTY CAN PALLETIZING SYSTEM devised by Standard-Knapp speeds and simplifies delivery of empty cans to user, expedites introduction of cans into filling and processing lines. Another example of Standard-Knapp pioneering in better packaging methods.



SIX-PACKS HIT JACKPOT in popularity with beer consumers. Carton inserter (above) is key machine in line of equipment developed for brewing industry by Standard-Knapp. New line handles cans at rate of 500-600 per minute.

● SEE OUR EXHIBIT AT THE PACKAGING SHOW BOOTH 346

IN PACKAGING-- *STANDARD-KNAPP EQUIPMENT IS AUTOMATICALLY MORE EFFICIENT*

STANDARD-KNAPP

DIVISION OF EMHART MFG. CO.

PORTLAND, CONNECTICUT

SAVED: $5,212 the first year

by a Hoerner Packaging Engineer*

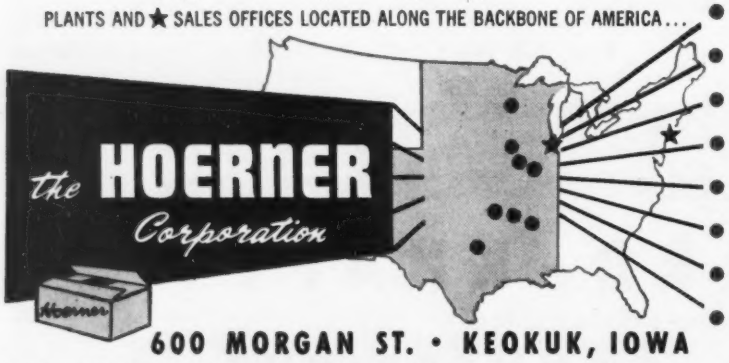
Here's Proof:

The Sun Fuel Master Furnace Division of the J. V. Patten Co., Sycamore, Illinois, makes furnaces. Until recently, they packaged them in wood. But interested in cutting their packaging and shipping costs they asked a Hoerner Packaging Engineer to tackle the job of packing their furnaces in corrugated. The result . . . in the first year after the change in their packaging operation, the Patten Co. estimates a savings of $5212.00. The company has saved money on packaging material, labor, freight, and through less damage in shipment.

If your company packages things, whatever they are, why not see what a Hoerner Packaging Engineer can do for you. It won't cost you a cent or obligate you in any way. It can mean an increased margin of profit through savings in labor and material costs, prevention of shipping losses. For a study of your packaging operations, just write to one of the Hoerner plants listed below.

**R. E. Bowles*

PLANTS AND ★ SALES OFFICES LOCATED ALONG THE BACKBONE OF AMERICA...

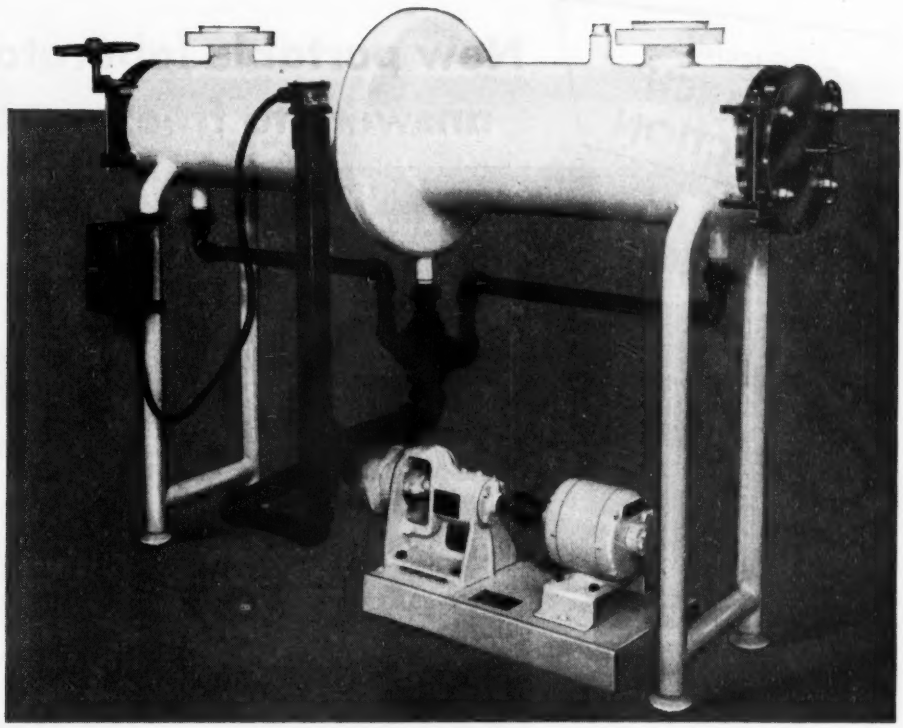


the **HOERNER** Corporation

- **ABC Corrugated Box Company** Minneapolis, Minnesota
- **Des Moines Container Company** Des Moines, Iowa
- **Ottumwa Shipping Containers** Ottumwa, Iowa
- **Iowa Fiber Box Company** Keokuk, Iowa
- **South West Box Company** Sand Springs, Oklahoma
- **Arkansas Box Company** Ft. Smith, Arkansas
- **Southwest Corrugated Box Company** Ft. Worth, Texas
- **Little Rock Corrugated Box Company** North Little Rock, Arkansas

600 MORGAN ST. • KEOKUK, IOWA

Sales Offices: 209 So. LaSalle St., Chicago 4, Illinois • 50 E. 42nd St., New York 17, N. Y.



Faster HEATING and COOLING can help you speed up production

If you are having trouble increasing your volume to meet peak seasonal demands, the heating and cooling steps are likely to be your major obstacles.

Continuous, high-speed heating and cooling can eliminate this bottleneck. By installing a Pfaudler shell and tube heat exchanger, you can heat or cool up to 33,600 pounds of product per hour.

LOW-COST OPERATION—Many well-known food companies are finding that Pfaudler stainless steel heat exchangers—built to sanitary code—enable them to increase their output considerably, without any increase in operating costs.

Maintenance is simple. Hinged stainless steel doors permit rapid in-place cleaning. And the high-speed efficiency eliminates the possibility of fermentation or spoilage. Pressures as high as 75 psi. are permitted by the sturdy welded construction.

To help you solve your heat exchange problems, Pfaudler has prepared a comprehensive 40-page heat exchanger manual. It has all the data you need to work out capacity and type problems. Easy-to-follow tables, curves and charts. Also full details on Pfaudler heat exchangers. Just mail the handy coupon for your copy.

Pfaudler

THE PFAUDLER CO., ROCHESTER 3, NEW YORK
Engineers and Fabricators of Food Processing Equipment

Gravity Fillers · Piston Fillers · Steam Peelers · Deaerators · Vacuum Pans · Evaporators

THE PFAUDLER CO., Dept. FE-3, Rochester 3, N.Y.
Please send me the Pfaudler Heat Exchanger Manual No. 837

Name_____

Title_____

Company_____

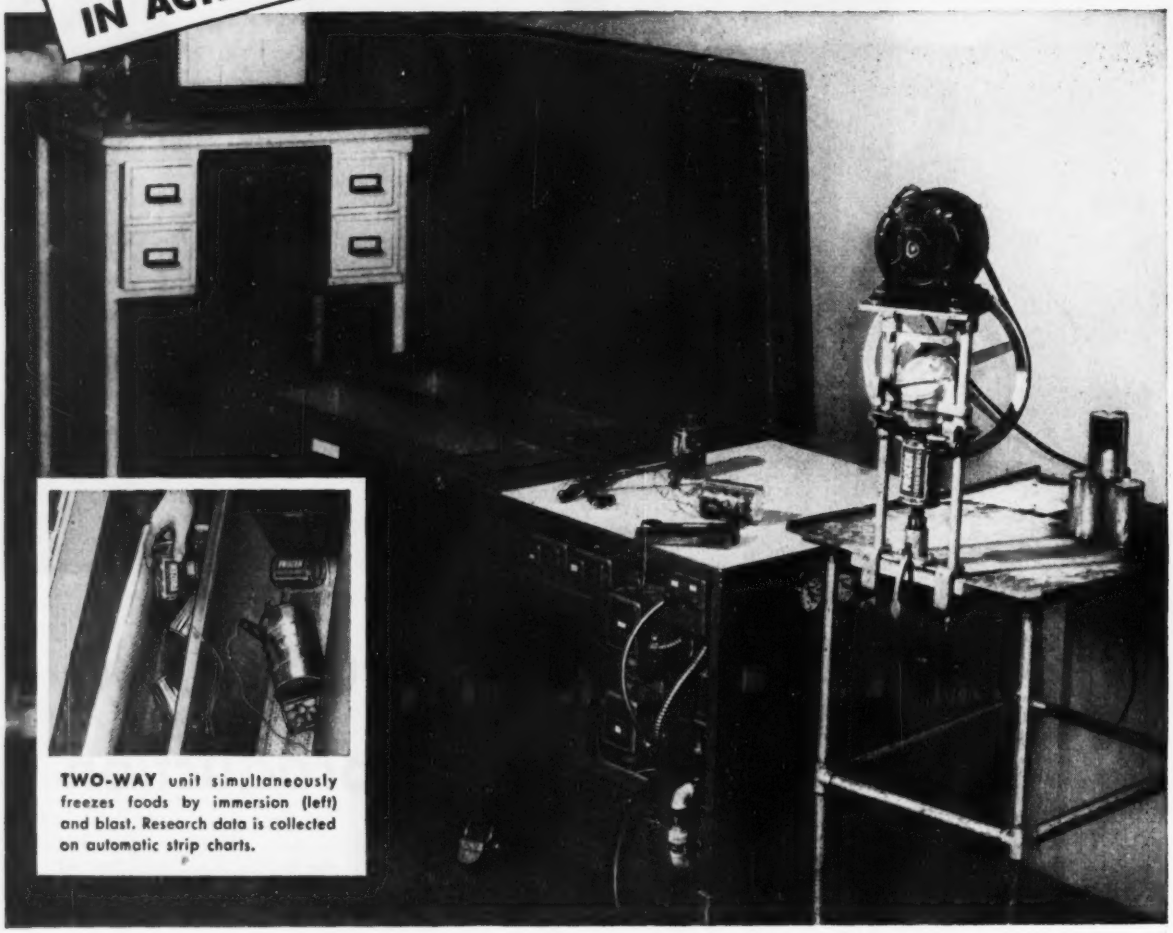
Address_____

City_____ Zone____ State____

Use coupon on page 179.

Continental **RESEARCH IN ACTION**

New portable laboratory speeds answers to freezers' problems



TWO-WAY unit simultaneously freezes foods by immersion (left) and blast. Research data is collected on automatic strip charts.

LAB EQUIPMENT includes a recording potentiometer, thermocouples, 2-way freezing unit, and atmospheric and gas-vacuum closing machines.

In the interest of its can-using customers, Continental has long maintained 17 field research laboratories throughout the U. S. Now it has an "18th"—a compact, portable laboratory which travels right into the plants of frozen food packers.

Quickly set up in 48 square feet of space, it carries out in miniature the packaging and freezing operations of a full-size freezing plant. Whether the product to be packed is a fruit, a vegetable or a seafood, the portable laboratory will help pick the best freezing time, the best size and shape of can to use, and the best packing procedure – air closure, vacuum or gas pack.

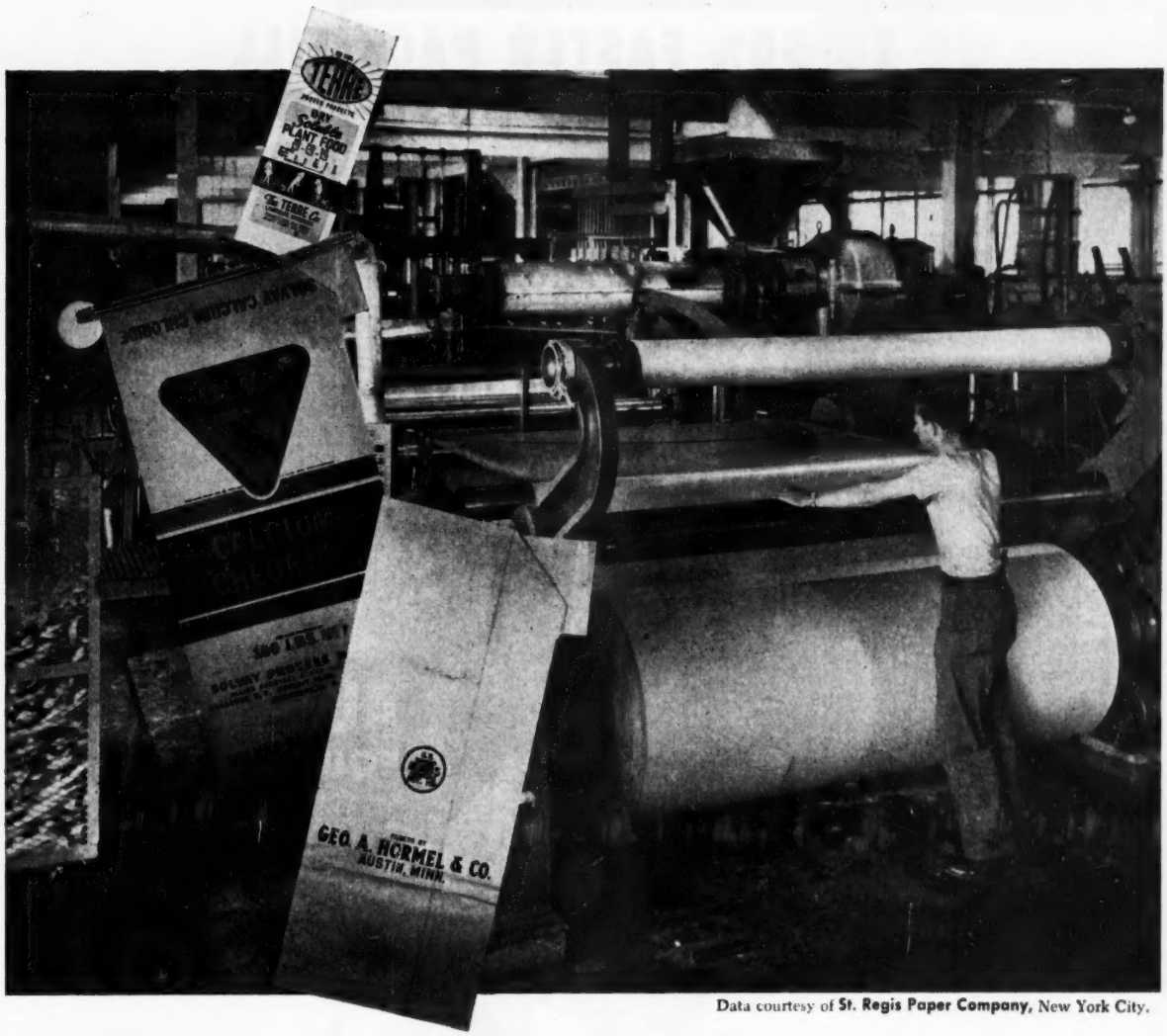
Continental's portable laboratory was designed and built by its own scientists and engineers. It has already proved its worth by helping several of our customers in widely separated sections of the country to produce better products at lower cost... and in helping Continental produce tailor-made containers for a fast-growing industry.

CONTINENTAL CAN COMPANY

Continental Can Building, 100 East 42nd Street, New York 17, N. Y.

EASTERN DIVISION: 100 EAST 42ND STREET, NEW YORK 17
CENTRAL DIVISION: 135 SOUTH LA SALLE STREET, CHICAGO 3
PACIFIC DIVISION: RUSS BUILDING, SAN FRANCISCO 4

TAILOR-MADE PACKAGE SERVICE



Data courtesy of **St. Regis Paper Company,** New York City.

Paper gets a Tough New Armor...

BAKELITE Polyethylene

TRADE-MARK

Paper's worst enemies are moisture, strong chemicals and micro-organisms. Now a tough, new armor—coating of BAKELITE Polyethylene—combats these foes and arms paper for scores of new packaging applications.

It presents an effective barrier against moisture, acids and alkalis that deteriorate packages from within. It prevents micro-organisms found in humus and peat moss from eating through bags. Chemically inert, it does not harm most foods, chemicals or fertilizers.

Paper coated with BAKELITE Polyethylene has greater tensile strength. The coating is resistant to abrasion and impact. Its superior flexibility at below-freezing temperatures makes it especially useful for frozen food packaging.

As a laminate for foil or cellophane, BAKELITE Polyethylene adds strength, toughness and heat-sealability. Used as a wax additive, it provides a glossier surface and reduced rub-off. Other packaging uses include squeeze bottles, flexible tubes and snap closures. Learn how this versatile plastic can help you improve your packaging. For information, write to: Dept. TY-74.

See BAKELITE's Exhibit, Booth 412
23rd National Packaging Exhibition
April 5-8, Atlantic City, N. J.

BAKELITE
TRADE-MARK
Polyethylene

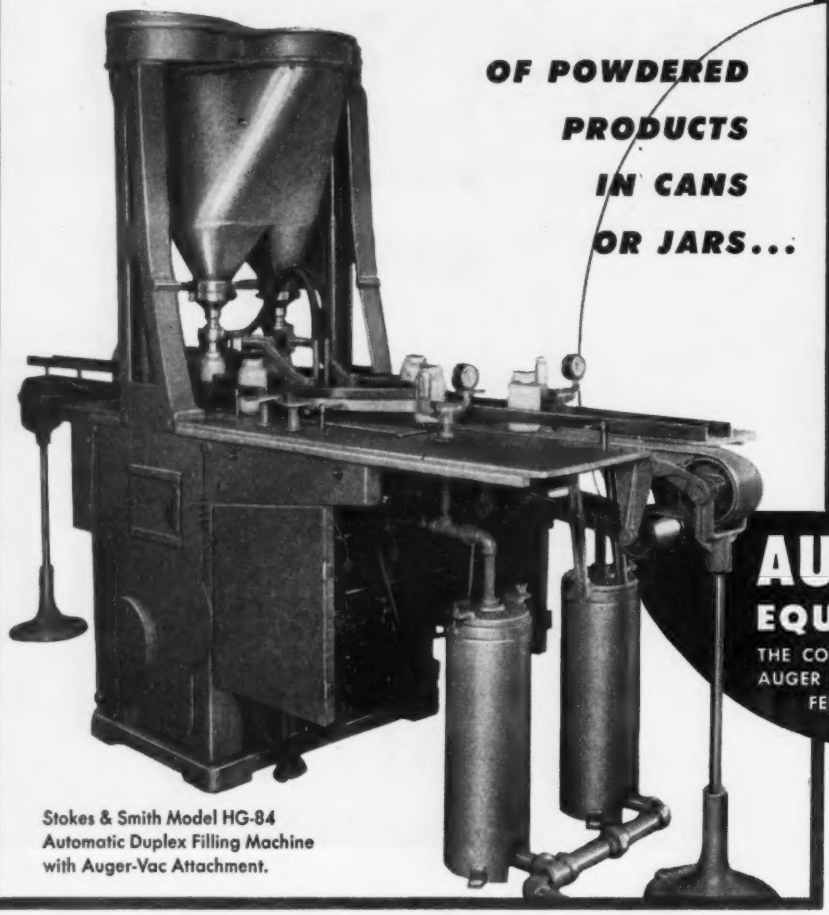
BAKELITE COMPANY, *A Division of Union Carbide and Carbon Corporation* UCC 30 East 42nd Street, New York 17, N. Y.

UP TO 50% FASTER PACK-FILL —WITH NO DUST—NO WASTE

OF POWDERED PRODUCTS IN CANS OR JARS...

AUGER-VAC EQUIPMENT

THE COMBINATION OF AUGER AND VACUUM FEED



Stokes & Smith Model HG-84 Automatic Duplex Filling Machine with Auger-Vac Attachment.

● For fast, dustless auger feed filling of hard-to-pack products such as coffee, non-fat milk powder, cocoa, flour and dehydrated foods, select S & S Auger-Vac equipment.

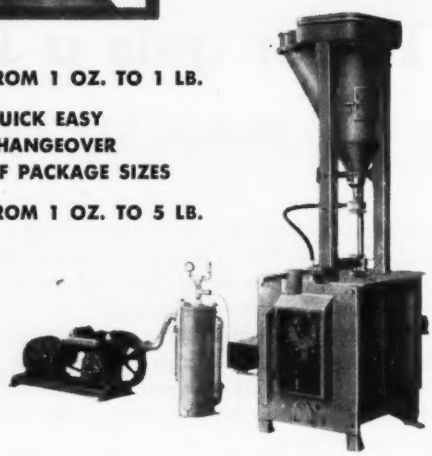
Operation is simple: A vacuum is first drawn on the container by a motor driven vacuum pump. The auger head then accurately tight packs the desired amount of product. Containers may be cans or jars of any air tight material.

S & S Auger-Vac equipment may be used with the STOKES & SMITH Single Unit Universal Filling Machine, or with the automatic fillers for higher production. Speeds up to 100 per minute.

- **FROM 1 OZ. TO 1 LB.**

  QUICK EASY CHANGEOVER OF PACKAGE SIZES

- **FROM 1 OZ. TO 5 LB.**



Stokes & Smith Model G-1 Single Unit Universal Filling Machine with Auger-Vac.

STOKES & SMITH CO.

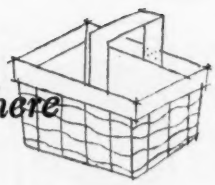
4911 SUMMERDALE AVE., PHILADELPHIA 24, PA.

Pacific Coast: SIMPLEX PACKAGING MACHINERY, INC., 534 - 23rd AVE., OAKLAND 6, CALIF.

fmc

SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION

TRADE MARK



Here's where Ritchie packaging pays off!

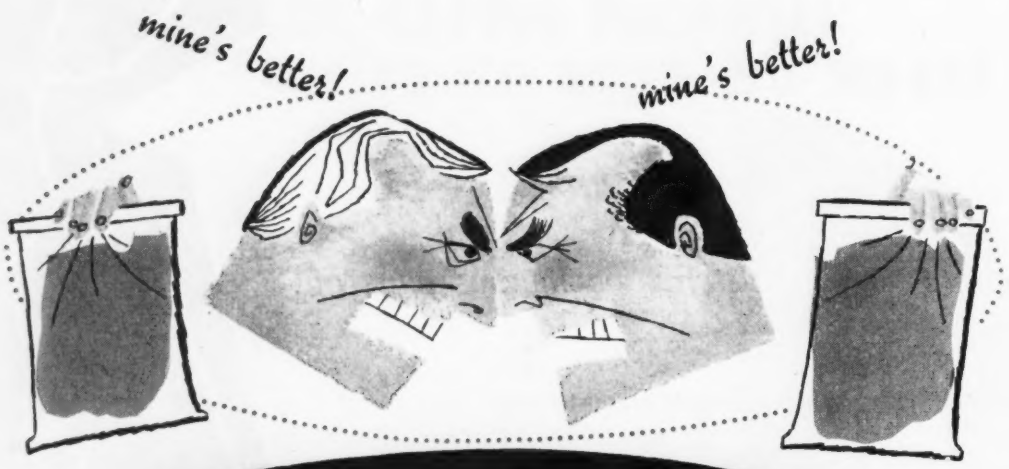
Yes, in the store! Where products compete for customers' attention—that's where good packaging, *Ritchie packaging pays off!* It pays off, too, wherever sales-appealing packaging appears in the prospect's view: on a TV screen, in an advertisement—and *always* on the dealer's shelf.

For years, Ritchie has put this sales-appeal into packaging for many of the John Sexton & Co. line of products. And Ritchie can help *you*. Broadest packaging line in the business, expert designers—*every* facility for planning, designing, for making folding cartons and displays, transparent packages, set-up boxes, fibre cans, paper spools.

SEE YOUR RITCHIE REPRESENTATIVE

W. C. *Ritchie* AND COMPANY *8836 Baltimore Avenue, Chicago 17, Illinois*

NEW YORK, LOS ANGELES, DETROIT, DALLAS, DENVER, ROCHESTER, ST. LOUIS, CLEVELAND, CINCINNATI, JACKSONVILLE, MEMPHIS



...some people compete the hard way
...others specify CHASE BAGS

Smart producers realize that after all the thought, time, and money invested in manufacturing a better product...it pays to package it more attractively and sell it easier and faster in a Chase bag. Here are a few Chase products designed to do JUST THAT!

CHASE PAPER BAGS AND MULTIWALL BAGS...

Chase "family-size" rice, sugar, and flour bags are colorfully printed to help SELL your product. Chase Multiwall bags are the ideal *low-cost* bags for packaging practically any product.

CHASE POLYTEX PLASTIC BAGS

Housewives buy what they see. Your citrus or produce packed in Chase polyethylene bags will look better—sell faster. Colorfully printed bags available in all sizes.

CHASE VISION-AIRE BAGS

Chase VISION-AIRE bags are designed to advertise your brand yet provide the necessary ventilation to keep potatoes fresh. Specify VISION-AIRE bags on your next order of packaged potatoes. It costs no more to get the best!

Ask your Chase Bag representative for free samples and current prices.

1844

CHASE BAG COMPANY

General Sales Offices: 309 W. Jackson Blvd., Chicago 6, Ill.
30 BRANCHES AND SALES OFFICES STRATEGICALLY LOCATED

Decitron

. . . INDUSTRY'S MOST RELIABLE ELECTRONIC COUNTER

Model D1
Counts up to 20 units per second: Other models up to 5000 UPS.

Model D2144
Double Decitron with 12 place tubes, counts gross lots as one unit on totalizer.

Model P2
Counts in any desired total 1-100. Other models 1-1,000,000

Model P4W
Desired counts by units 1-10,000 and wired-in warning system.

New, highly perfected Decitron electronic counters cover every counting need . . . from pills to case lots — in any quantity — at amazing speeds (up to 6000 units per second.)

Preset counters afford desired total counts i.e. dozens, fiftys, gross lots, etc. Lineal footage counters totalize production of paper, cloth, etc. Warning systems and other circuits can be energized by these counters if desired.

Write today — we want your counting problem.

POST

ELECTRONIC PRODUCTS DIVISION
POST MACHINERY COMPANY
Beverly, Massachusetts

NATIONAL CAN
PACKAGING FOR

Spinach and Spaghetti are two of the many popular products that rely on National Can for truly dependable packaging. This dependability is assured by NC's team of production expert, research chemist, agronomist and merchandising counsel — whose half century of can making know-how constantly works for greater efficiency on your packing line and longer life on your customers shelves. A call or wire puts them to work for you! No obligation, of course.

NC

NATIONAL CAN
CORPORATION
Plants At: BALTIMORE, MD. • CHICAGO, ILL. • MASPETH, N.Y.
CLEVELAND, OHIO • HAMILTON, OHIO and WARREN, OHIO

Cookie box that needs no inner liner or overwrap

Plezall Scotch cookies must be protected from moisture to insure their tasty crispness. While a conventional cookie box with overwrap and inner liner provided adequate protection for this product, the packager decided to investigate ways and means to reduce further his packaging costs and increase the product's shelf life.

The answer to this problem was found in a .020" boxboard carton with a coating of "Alathon" polyethylene resin on the inside. Tests proved the coating of "Alathon" more moisture-resistant than an overwrap. Since "Alathon" also resists greases and oils, the coating made both the overwrap *and* inner liner previously used unnecessary. Mr. E. C. Gueroult, Pres. of Plezall Cookie Co., Chicago, sums up the prime economies this way: (1) no overwrap inventory, (2) no overwrap labor, (3) no overwrap machinery, (4) no inner-liner inventory and (5) no inner-liner labor. Another point is that the coating of "Alathon" helps give the cookies the longer shelf life so important for baked goods.

Study the properties of Du Pont "Alathon" in relation to *your* packaging needs. "Alathon" is strong, stays tough and flexible through a wide range of temperatures—from tropic heat to 100°F. below zero. It is tasteless, odorless and nontoxic . . . resists most greases, acids, oils and alkalies. For more information, fill in and mail the coupon below.

*REG. U.S. PAT. OFF.

DUPONT
ALATHON
Polyethylene Resin
BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

Which type of package are you interested in?

- ☐ Multi-wall bags
- ☐ Single-ply bags
- ☐ Pouch bags
- ☐ Board trays
- ☐ Fiber drums
- ☐ Board cartons
- ☐ Corrugated boxes
- ☐ Fiberboard containers

E. I. du Pont de Nemours & Co. (Inc.)
Polychemicals Dept. 543, Du Pont Bldg.
Wilmington 98, Delaware

Please send me information on the properties and advantages of coatings of "Alathon" for the type(s) of packages I have indicated.

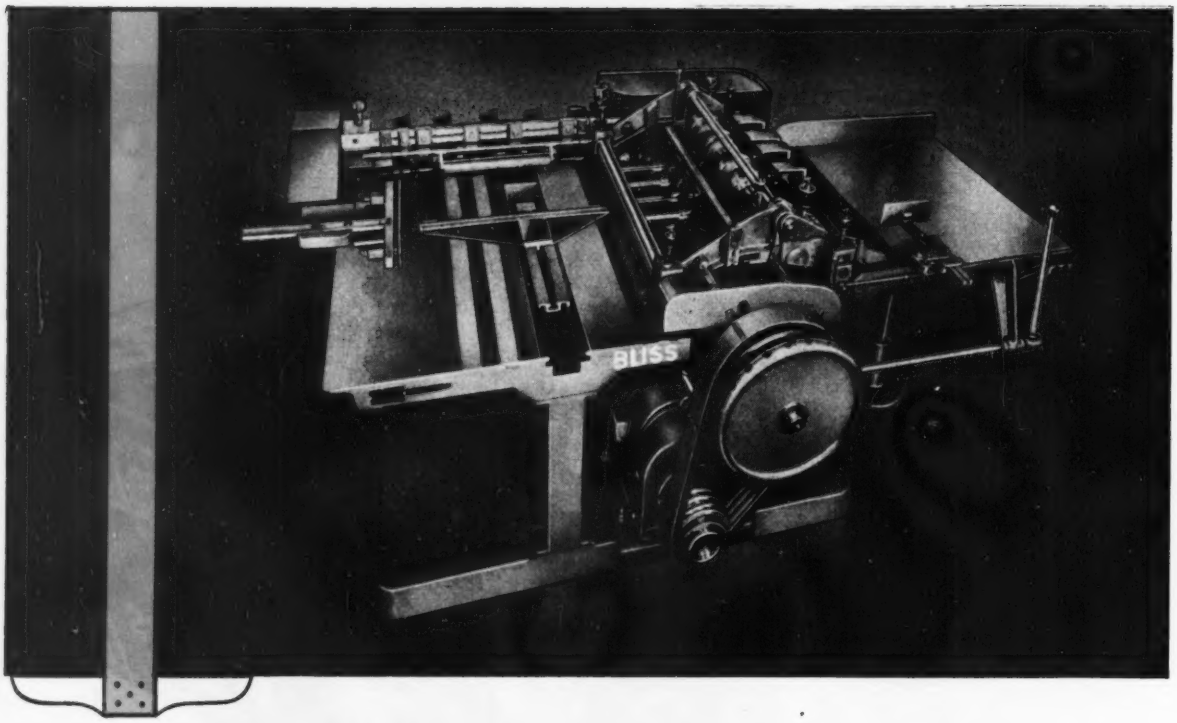
*Name*_____

*Title*_____

*Company*_____

*Address*_____

*City*_____ *State*_____



PERFECTLY REGISTERED SHEETS begin with PERFECTLY SQUARED SHEETS

...and the Bliss Duplex Squaring Slitter is your answer to perfect squaring...

When you begin with micrometer tolerances there's seldom a chance of spoiled litho sheets through poor register. And the unusually accurate gaging possible with the Bliss Slitter starts you off with perfectly squared sheets.

That means that right down the line—in all your production operations—you can hold far finer tolerances. You eliminate "multiplying" errors; you eliminate spoiled sheets.

You can also use the Bliss Slitter to cut body blanks: trim the sheets in the first operation and slit the sheet into strips or large blanks on the second operation table.

And remember: the Duplex Squaring Slitter, like the other labor and time-saving equipment in the Bliss line, is designed and built by one of the oldest firms in the can and container field.

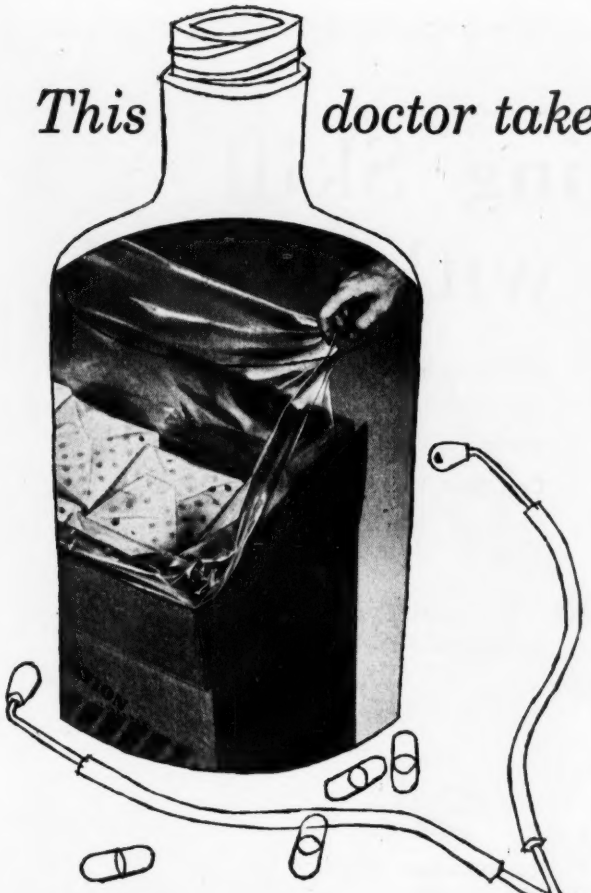
Bliss engineers will be glad to help you work out your production problems. No obligation, of course. Meanwhile, to learn more about the Duplex Slitter and other Bliss machines, write today for Catalog 36-A.

E. W. BLISS COMPANY,
50 Church Street,
New York 7, New York

BLISS on your machine is more than a name...*it's a guarantee*

BLISS CAN AND CONTAINER MAKING MACHINERY

This doctor takes his own medicine!



For years VISKING's job has been to write the best possible prescriptions that would solve packaging problems for others.

It wasn't surprising, then, that we should write a prescription for ourselves when we faced a problem in moisture control.

VISKING's NoJax Casings (for SKINLESS franks) are at their best for processing when they leave the plant. They are packaged in an atmosphere containing just the right amount of water vapor.

But the conventional shipping carton did not keep them in that state. Sometimes they got too dry. Sometimes they absorbed too much moisture.

Exhaustive tests in the VISKING laboratories showed that a carton liner of **VISQUEEN** film would provide complete moisture control. Now every carton of NoJax contains a **VISQUEEN** liner. Casings are always in perfect shape for the packer's stuffing table.

If you have a tough packaging problem involving moisture, corrosives or what have you, consult a **VISQUEEN** converter. Our technological skills are at his call. To get better packaging, use the coupon.

VISQUEEN®

Important! VISQUEEN film is all polyethylene, but not all polyethylene is VISQUEEN. The VISKING CORPORATION pioneered pure polyethylene film. Only VISQUEEN has the benefit of our technical skills and research. VISQUEEN is produced by process of U. S. Patents No. 2461975 and 2632206.

VisQueen® film...

a product of the Visking corporation

World's largest producers of polyethylene sheeting and tubing

Plastics Division, Terre Haute, Indiana

In Canada: Visking Limited, Lindsay, Ontario

THE VISKING CORPORATION, BOX R3-1410
Plastics Division, Terre Haute, Indiana

Send me names of VISQUEEN converters serving my area.

Name_____

Company_____

Address_____

City_____ Zone____ State_____

GETTING A HEAD START ON QUALITY!

Mold-Making Skill is a Tradition with BALL

Precision devices constantly test the quality and uniformity of Ball Glass Containers at every stage of manufacture. But in producing the molds which shape your containers, human skill and experience are vital. Ball Brothers take pride in the craftsmanship and know-how of their mold makers, carrying on a tradition of excellence that has made Ball the best known name in glass.

Call Ball first of all for:

Stock or Special Mold Glass Containers... Plain or Lithographed Metal Screw Caps.

BALL BROTHERS COMPANY • MUNCIE, INDIANA

Closure Division: The ARIDOR Company, 3428 W. 48th Place, Chicago 32, Ill.

Offices in All Principal Cities

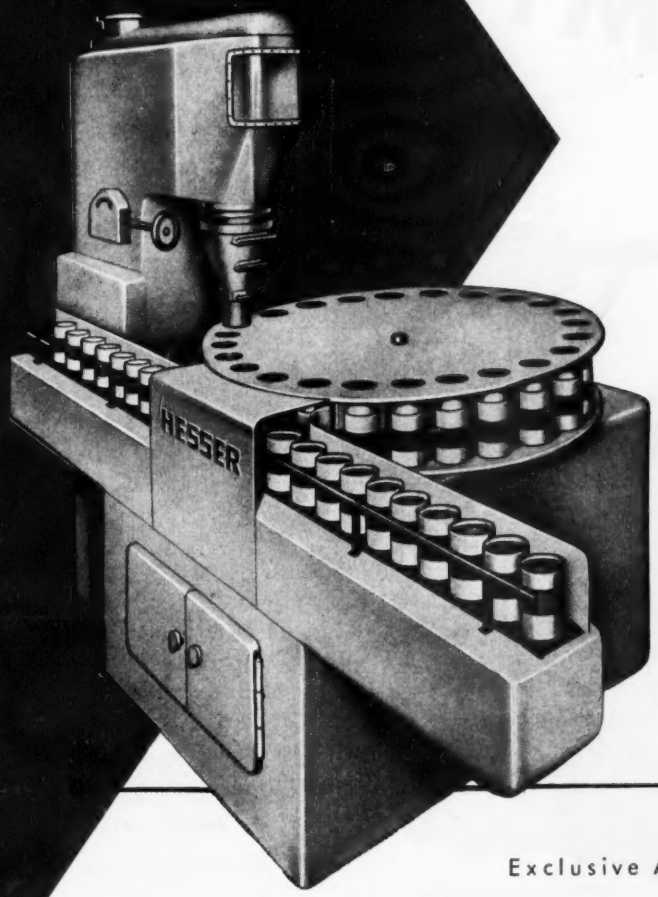
CALL Ball FOR CONTAINERS, CLOSURES AND PACKAGING ENGINEERING SERVICE

HESSER

...hibit in Atlantic City booth 1022

a new cocoa filling unit and are at your entire service
with our whole program which includes:

- **Weighing**
- **Wrapping**
- **Bundling**
- **Printing**
- **Packaging**



Exclusive Agents for the U.S.A.

GEVEKE & CO., INC.

25 BROADWAY, NEW YORK 4 N.Y.

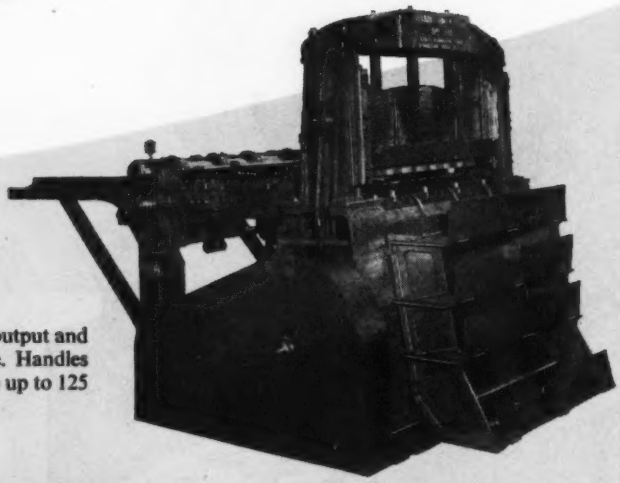
FR.HESSER MACHINE BUILDERS A.G.
STUTTGART-BAD CANNSTATT • GERMANY

Use coupon on page 179.

HAMILTON Can Body Flanger

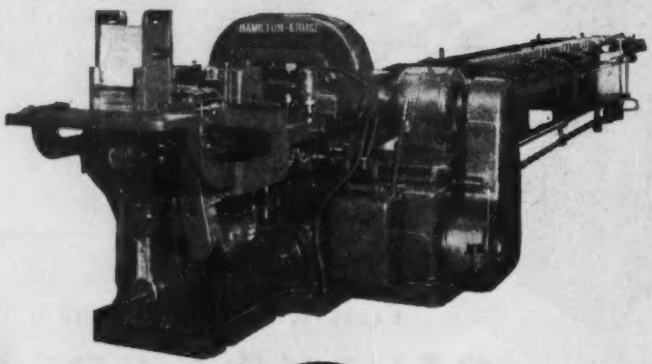
Model 301 automatically flanges up to 300 cans per minute . . . for round cans up to 4¼" diameter. Three other high-speed flangers for larger round cans and square cans.

HAMILTON



HAMILTON
Scroll Shear

Cuts costs by speeding output and saving 4-7% in tinplate. Handles sheets 25" to 36" square up to 125 strokes per minute.



HAMILTON
Bodymaker

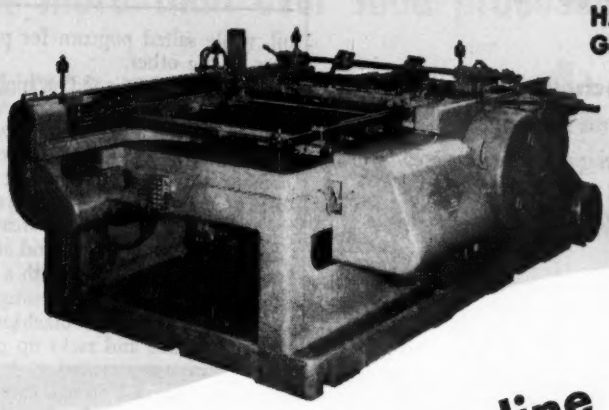
Designed for high speed, completely automatic, long-run production of can bodies from 2-1/16" to 4¼" in diameter and 2⅛" to 5-3/16" in height.

Write!

For full information and specifications on any Hamilton automatic can machinery, write to Hamilton Works, Baldwin-Lima-Hamilton Corporation, Hamilton, Ohio.

BALDWIN · BLH · LIMA-HAMILTON

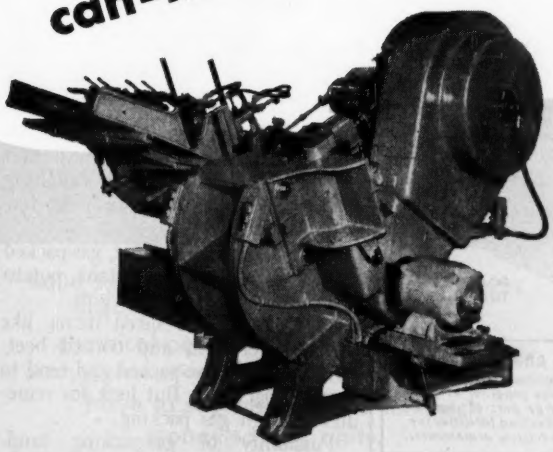
BALDWIN



HAMILTON Duplex Gang Trimmer and Slitter

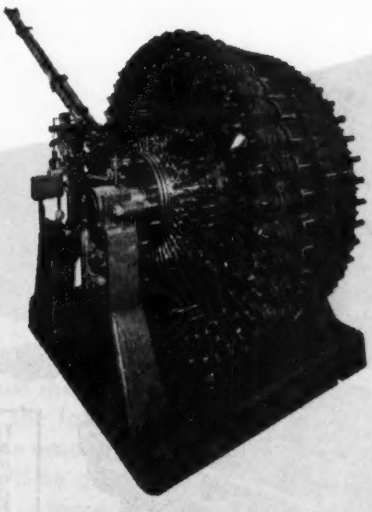
Boosts production by slitting up to seventy 36" sheets and cutting them into body blanks each minute. Newly designed for less maintenance and lower operating costs.

.world's most complete line of modern...high-speed...cost-cutting can-making machinery



HAMILTON Strip Feed Press

Built to last!... The last word in high-speed, low-maintenance strip feed presses. Up to 300 strokes per minute.

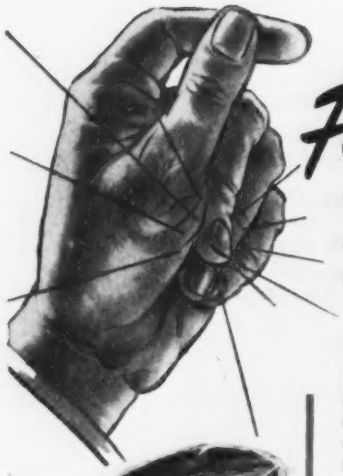


HAMILTON Can Tester

Capable of speeds above 300 cans per minute, model 301 automatically tests sanitary cans with diameters up to 4¼" and heights up to 7⅛". Model 302 tests larger cans.

LIMA • HAMILTON

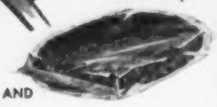
HAMILTON WORKS • HAMILTON, OHIO



Fast as a Snap!

These products—plus an endless variety of others are package-wrapped

...ready for market!

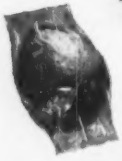


MEATS AND BACON

DAIRY PRODUCTS

CANDIES & CONFECTIONS

BAKERY PRODUCTS



CITRUS FRUITS & VEGETABLES

AUTOMATIC — continuous rotary motion provides amazing, new, high speed wrapping production — eliminates counter-acting motion that causes material breakage and machine down-time.

"FLOAT" WRAPPING — packages products of regular or irregular shape *without* breakage or crushing whether product is hard, soft, firm or brittle. Size change-overs accomplished with minimum down-time.

POSITIVE SEALING — by heat, glue or crimping keeps moisture where you want it—in or out. Sanitarily protects against dirt, dust and handling. Ends may be flared, folded under or diamond folded — longitudinal seams heat or glue sealed.

SAVES LABOR . . . MATERIALS — push button, *automatic* feeds permit one person operation and tending of several machines at the same time. And, because no stiffeners are required, *unless desired*, savings of 25 to 50% in materials are effected.

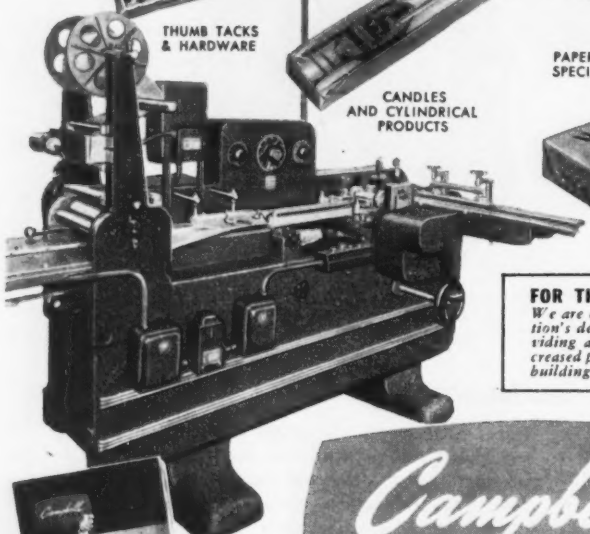
USES ALL MODERN WRAPS — Cellophane, glassine, foils, films, polyethylenes and others. Electric registration accurately positions pre-printed or attached labels.

THUMB TACKS & HARDWARE

CANDLES AND CYLINDRICAL PRODUCTS

PAPER SPECIALTIES AND TEXTILES

SOAP AND TOILETRIES



FOR THE ARMED FORCES
We are contributing to the nation's defense program by providing a large part of our increased production facilities for building precision armaments.

New! Completely revised free booklet—Write for your copy.

Campbell WRAPPER

HUDSON-SHARP MACHINE CO. • GREEN BAY, WIS.

Manufacturers of Aniline and Gravure Presses, Folders, Interfolders, Laminators, Waxers, Embossers, Slitters, Sheeters, Roll Winders, Packaging Machines, Creepers and Tissue Converting Units.

NEW YORK: 55 WEST 42 STREET

See the Campbell Wrapper in Action—Space 306 AMA—Atlantic City

Flexibles Revamp Pattern

—*Continued from page 74*

oil, while salted popcorn for popping goes in the other.

It has also designed a high-speed machine for packaging 1½ oz. of Nestle's sweet milk cocoa powder in heat-seal coated opaque glassine. New here are two devices: One die-cuts the web traveling through the machine to form a pull-tab opening area on the top edge of the pouch. And after the top is folded, it is sealed with a rupturable closure for quick opening. The other device, at the machine's discharge, flattens and racks up pouches so that an operator can grab several at a time and pack 50 to a carton.

Another machine forms a tea bag, then fills and seals each bag. It also attaches and wraps a paper tape around each bag. Speed is 60 bags per minute.

Machines are getting more and more versatile. They are forming pouches from a roll of paper, foil, or film; filling by count, volume, auger, net weight, or special feeds; and then heat-sealing pouches at speeds up to 120 per min. Others include even printing, coding, and perforating attachments. And attached to one machine is a cartoner that automatically sets up cartons from a stack, gathers desired number of pouches, and inserts them into cartons, that are then glue-sealed or tuck-closed.

Inert-Gas Packaging

Gas-packing in flexible pouches will open new fields. Some shelled nuts are beginning to be packed in this manner (Kemp Nut Co., Boston). And many more packers will be switching to this method with the next few years.

Look for longer-keeping, gas-packed whole milk powder, instant potato powder, and also potato chips.

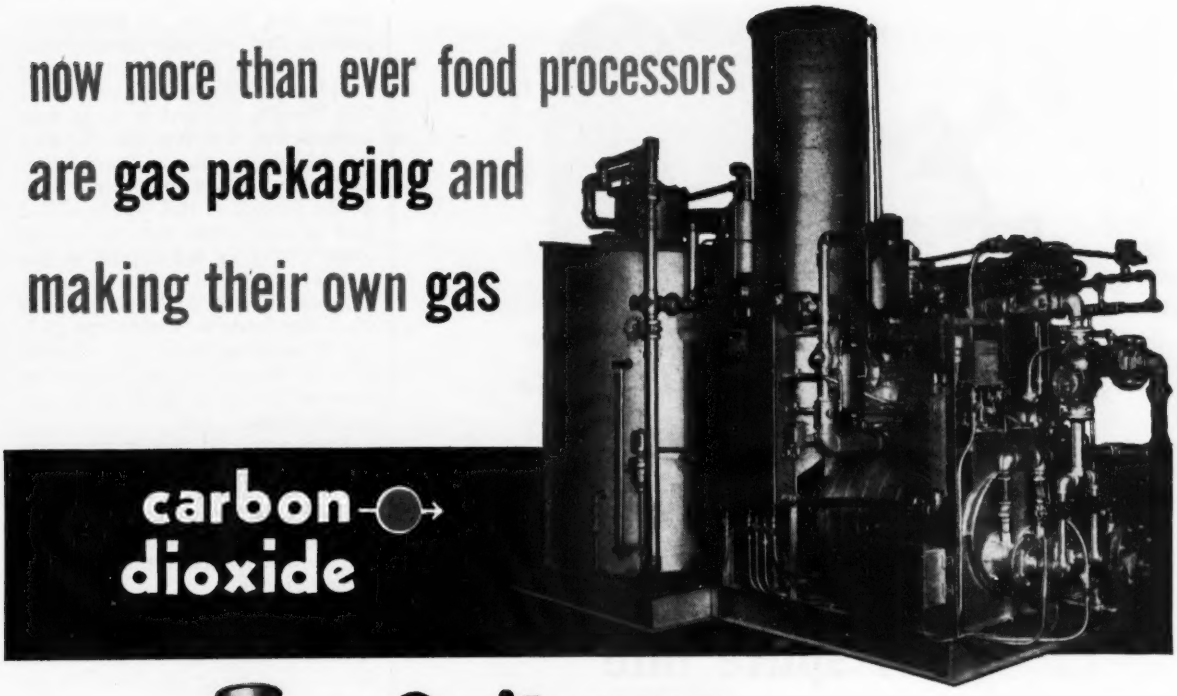
Certain soft-type sliced items, like cheese, liverwurst, and corned beef, cannot now be vac-packed and tend to "weld" together. But look for remedies through gas packing.

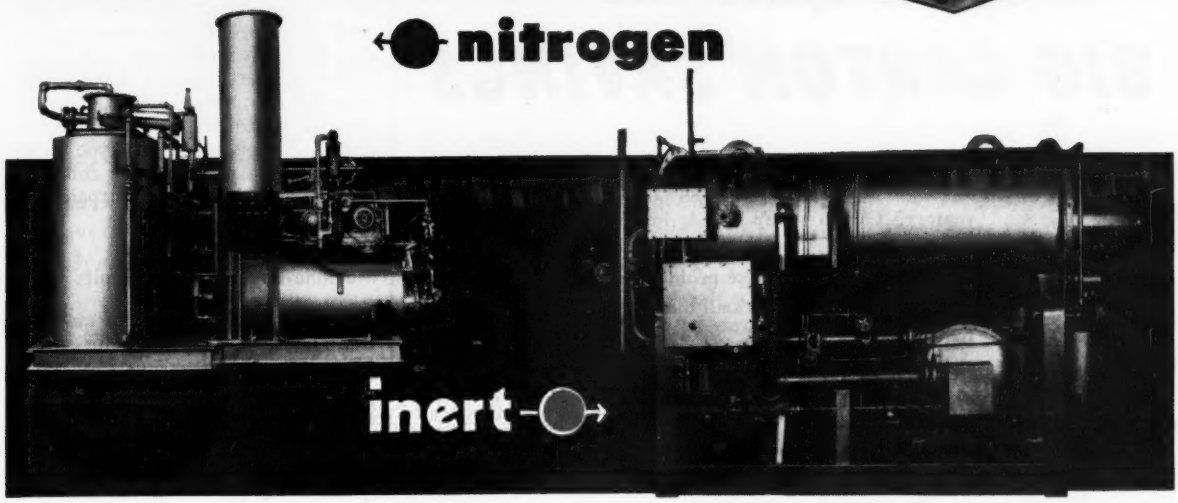
Possibility of gas-packing sandwiches for merchandising in refrigerated supermarket display cases and coin-despensing machines is not far-fetched. Storage tests of this type item reveal long keeping qualities.

There's also a likelihood—off-in-the-future—of development of a special gas-packing technique for fresh meats. In this event, fresh-meat prepackaging could then be carried out by the meat packer instead of behind the counter by the retailer.

And not too distant is appearance of foods like soups, single-strength juices,

now more than ever food processors are gas packaging and making their own gas





Solid investments that pay for themselves in two years or less — that's what chemical people, who have installed Gas Atmospheres' gas generating equipment, have to say about these compact, money-saving units.

If you now use carbon dioxide, nitrogen, or inert gases in the manufacture or packaging of your product, or are considering adapting this modern method to your operation, it will pay you to find out what we mean when we say that — if you use gas, in any amounts at all, Gas Atmospheres can show you, with your own figures, how you can save the cost of the equipment in two years or less, and from that point on have the most inexpensive gas supply available.

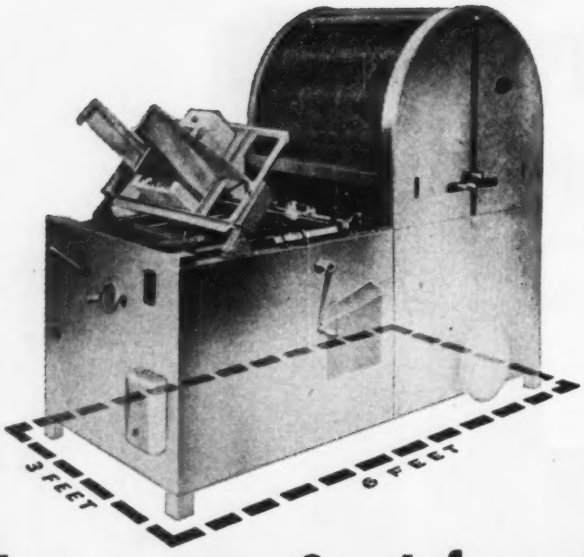
Get the facts. Write today. Let us know the amounts and type of gas you use and we'll be glad to show you why last year more chemical plants installed Gas Atmospheres equipment than ever before.

gas Atmospheres, inc

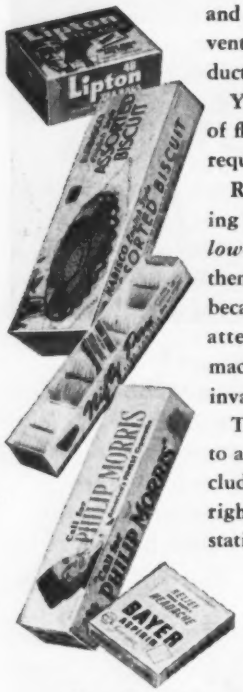
equipment for producing industrial gases

20011 WEST LAKE ROAD CLEVELAND 16, OHIO

Use coupon on page 179.



How to turn 3 x 6 feet of floor space into BIG CARTON SAVINGS



What are your biggest cartoning headaches? High carton and labor costs? Lack of storage space for your carton inventory? Carton set-up speeds inadequate for your production demands?

You can wipe out these problems in just 18 square feet of floor space — for that's all our model PA carton former requires.

Right from the start, you'll make large savings over buying prefabricated or hand-set-up cartons. Model PA uses *low-cost blanks* that are easy to store and handle — forms them into sturdy, firmly glued cartons. Labor costs are cut, because the PA needs only the part-time attention of an attendant. And the production margin afforded by a machine that can turn out up to 102 cartons a minute is invaluable at peak production periods.

The PA is adjustable for various sizes. Can be adapted to a great variety of carton styles and any carton stock, including corrugated material. Cartons come out of machine right-side-up and can be conveyed automatically to filling stations.

Write for literature on the Model PA.

PACKAGE MACHINERY COMPANY
SPRINGFIELD, MASSACHUSETTS

See Us at the PACKAGING SHOW
Atlantic City Auditorium
Apr. 5-8 Booth 311

NEW YORK PHILADELPHIA BOSTON CLEVELAND CHICAGO ATLANTA
DALLAS DENVER LOS ANGELES SAN FRANCISCO SEATTLE TORONTO MEXICO, D.F.

sauces, and the like, in flexible-type pouches that will take steam-sterilizing. Promising materials, at this date are a heavy gage vinyl film and a vinyl-foil laminate. Vinyl seals at high temperatures, therefore does not tend to delaminate during sterilization. Cost permitting, a convenient, lightweight package of this type would, at least in such items, abolish the consumer's handling and disposal of cans and jars.

Research points to the possibility of sterilizing foods in flexible-type packages by ionizing irradiation. If made feasible, this could give quite an impetus to the use of "flexibles" for perishable items.

Some powdered milk is now being packed in a siftproof, moistureproof, foil-paper laminate, which is poly-coated on the outside for sealing. Contents of the convenient 3½-oz. package are readily reconstituted to make a quart of milk.

Single-service portions of soy sauce are going into poly-coated cello. A triple-ply laminate—acetate-foil-Pliofilm—is now being employed to gas-pack portion-controlled amounts of a dehydrated cream product.

One contract packager is now packaging soluble coffee in 4-oz. pouches for the restaurant and institutional trade. Expansion of this type packaging is a "natural", since coffee is thus easier and quicker to prepare and each batch is uniform.

Machine-Bagging Dried Fruits

Recent development of a mechanized pouch-packing line for dried fruits has eliminated clostly hand-packing and the inventory of preprinted, preformed bags. This inventory has involved maintaining of various basic designs of bags for the different fruits, and has been further complicated by various grades and weights.

Employed are a special feeder-weigher unit, Transwrap pouch former-filler-sealer machine, and the new packaging material, K-202 (duPont's saran-coated cello). K-202 is clear and flexible.

The feeder-weigher is designed to permit an even, steady flow of bulky, not-so-easy-to-handle, non-free-flowing dried fruits. Stickiness of fruits flowing from the hopper is first eliminated by a fine water spray. Uniform flow is then attained as fruits travel beneath a corrugated, rubber-coated, lump-breaking-leveling roll. A vibrating feed trough then delivers fruits to net weigh units on the Transwrap. Rate is about 44-48 packages (1 or 2-lb. units) or 64 packages (½-lb. units) per minute.

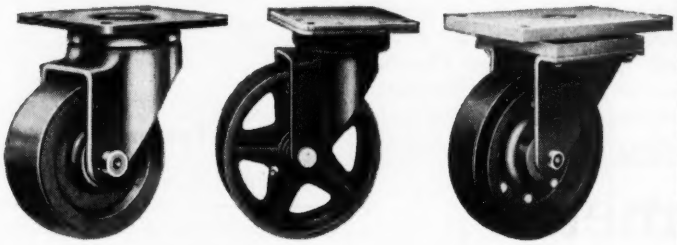
Formerly required were about 14

with Colson® materials-handling equipment

Through processing, in and out of storage, on and off freight cars and trucks—for every move you make there's a COLSON materials-handling product to help you speed the flow of goods.

There are over 1500 models of famous COLSON Casters—many of them designed to meet the special needs of food processing and packaging plants. COLSON also manufactures such cost-cutting materials-handling equipment as Box Trucks, Drum Trucks, Platform Trucks, Hand Trucks and Lift-Jack Systems, such as shown above.

COLSON
UNIVERSAL DRUM
TRUCK



Write us or check the yellow pages of your phone book (under "Casters" or "Trucks, Industrial") for the COLSON office near you.

THE COLSON CORPORATION
ELYRIA, OHIO

CASTERS . . . . LIFT-JACK SYSTEMS . . . . INDUSTRIAL TRUCKS

Mail Coupon Today

THE COLSON CORPORATION
ELYRIA, OHIO

Please send free catalog on "Colson Trucks and Casters"

NAME .....

POSITION .....

COMPANY .....

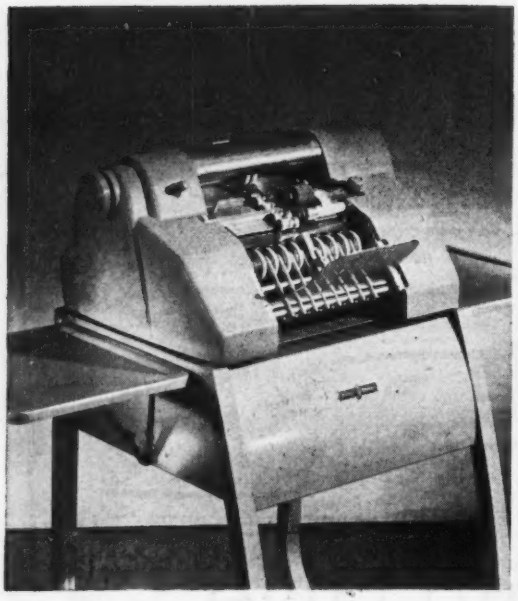
ADDRESS .....

CITY .....

ZONE ..... STATE .....

Use coupon on page 179.

Hundreds of firms use the Tickometer to code and date labels, coupons, etc., and save printing costs as well as time.



Want something counted?

...and/or imprinted with date or code?

Hundreds of sales slips, time cards, coupons, piecework tags, etc., can be counted in seconds, accounting speeded up, better controlled.

Then here's how you can make really big savings . . . eliminate the "hidden costs" that make these jobs expensive!

The Pitney-Bowes Tickometer will count, and optionally code, date or otherwise imprint product labels, job tickets, coupons, checks, etc.... at speeds up to 1,000 pieces a *minute*... five to ten times faster than experienced workers can count or stamp by hand. And it's so accurate, banks use it to count currency!

Thousands of firms in many lines of business use the Tickometer to get fast accurate results. Especially valuable to food and drug processors and packers for faster, cheaper, coding or dating and identifying of their product labels.

Rented rather than sold, the Tickometer quickly pays for itself. Service is available from 201 service points, coast-to-coast. Ask your nearest PB office for a demonstration, or send for free illustrated folder and booklet of case studies in various fields.

Anyone can use the Tickometer to count anything that needs to be counted... at speeds up to 1000 a minute!

PITNEY-BOWES

Tickometer

Counting & Imprinting Machine

Made by the originators of the postage meter . . . offices in 93 cities in U.S. and Canada.

PITNEY-BOWES, INC.
3843 Pacific St., Stamford, Conn.

☐ Send Tickometer folder ☐ Send case studies

Name_____

Address_____

workers on the line. But now only 4 are needed to turn out the same volume.

A similar machine is now being used to random-pack vanilla wafers coming from a 300-ft., 1,500-lb.-per-hr. band oven. Pouches are machine-formed, filled with ¾-lb. of wafers, and sealed at a speed of about 26 per minute. Another machine is being designed for pretzel sticks.

Now in the process of being developed is a fully automatic machine for packaging midget-type items like liver sausage, bologna, and salami in 8 or 12-oz. units. Machine will be hooked up with a sausage stuffer, and it will form, fill, and seal (with aluminum clamps) saran pounches.

Breakfast cereals are being packaged by General Mills in transparent, single-serving pouches at the rate of 60–65 a min. by bag-forming-filling-sealing Transwraps. Pouches holding 1⅛ oz. of dry cereals are then packed 10 to a carton. Conventional method has involved packaging into cartons that are then packed 10 to a cardboard tray.

Heinz is now vacuum-packing dill pickles—and without need of an added preservative—in transparent, brine-leakproof poly-cello pouches. The cellophane is four-color printed on the reverse side.

Hand-opened pouches are inserted over mandrels on a rotary filler that feeds 1 or 2 pickles into each bag. Pouches then continue to a battery of dual-head, Flex-Vac vacuumizing-sealing machine.

Pouches of saran-type copolymer film are being used for poultry, meat loaves, franks, hams, butts, shoulders, and ring bolognas. The form-fitting, "skin-tight" packages are produced on a continuous bag vacuumizing, sealing (with aluminum clips), and shrinking line. This is perhaps the first vacuum-sealing technique employed for bags, as differentiated from pouches.

End (Resume reading on page 75)

Bundling Frozen Foods

—Continued from page 81

six to twelve months, sufficient evidence will be obtained to give reasonably definite answers to the above questions.

Fitting Bundler to Line

Problems still exist for the machinery supplier to work out a smooth flow of packages to and from the bundling machine. All experiments prior to the present Pictsweet tests required bundling directly from freezing tunnel,

Make Your Package Your Crack Salesman!

EKCO - FOIL CONTAINERS

The Greatest Packaging Development of the Century!

Ekco-Foil, the wonderful new pre-shaped aluminum foil package, offers advantages no other packaging material can duplicate! You can prepare your product in Ekco-Foil . . . freeze or refrigerate it in Ekco-Foil . . . then sell it in the same attractive Ekco-Foil package. Labor costs go way down . . . and sales go way up! Your bright silver Ekco-Foil package promises quality and convenience to Mrs. Consumer. She just reheats and serves your product right in its Ekco-Foil package. And she can reuse the package too!

Ekco-Foil makes it practical for you to take advantage of this new packaging material right now, because Ekco-Foil is available for immediate delivery in every size and shape you need! Only Ekco has a complete selection! Only Ekco can make your foil containers in any quantity!

Ekco-Foil has never failed to raise sales for any product. Why not see what it can do for you!

EKCO PRODUCTS COMPANY
1949 N. Cicero Avenue, Chicago 39, Illinois
Also Available From Ekco Products Company (Canada) Ltd., Toronto

VALUABLE COUPON

EKCO Products Company, Industrial Foil Division FE-3
1949 N. Cicero Avenue, Chicago 39, Illinois

( ) Please send Bulletin and samples.
( ) Please have representative call.

FIRM _____

NAME AND TITLE _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

We are interested in Ekco-Foil for packaging _____
please list products

©1954

Use coupon on page 179.

PACKAGING SPECIAL

plate-freezing trays, or storage cases. Methods were worked out, in each instance, to assemble packages semi-automatically from trays and screens.

Pictsweet is attempting to set up the bundling machine for pre-frozen products filled by two high-speed machines and then wrapped by two high-speed machines. Feed will be directly from the two wrappers to one bundler. A 150-packages-per-min. output from each filler will assure a total of 300 packages per minute, which is sufficient for the bundling machine.

Semi-automatic assembly is being used at Pictsweet, because the machinery supplier feels that a more adequate understanding of the variety of feeding conditions presented for the machine will be required before an assembler can be provided. Meanwhile, with present Pictsweet methods, assembly is being accomplished with the same number of workers previously used for case-packing.

In addition to the Pictsweet experiment, another experimental run has been launched by a Northwest Canadian frozen fish-filleting firm. This firm had found it necessary, for competitive reasons, to package into one-dozen cases and in order to counteract the costs of in-and-out charges, to pack four, one-dozen cases into a four-dozen master case.

Cost charts were worked out, as shown in Table II, and a decision was made to bundle with a Package Machinery's wrapping machine. The savings to be shown were significant, due to the use of the extra master cases. While this experiment has been underway for 60 days, it is too early to draw conclusions on the same questions raised with the Pictsweet experiment.

End (Resume reading on page 82)

Damage In Shipping

—Continued from page 77

tection of product in transit is nominal—certainly so when compared with a loss of sales and distributor goodwill.

Progress Has Been Made

During the time the transportation and packaging survey was conducted, shippers were notified when the damage in transit was their fault.

Photos were taken to show failures on the part of shippers, in properly preparing and loading their car. These pictures were sent to the companies, accompanied by suggested ways in which the carloading could be improved.

Subsequent shipments by these concerns were then checked during the remainer of the time of the survey. And in most cases, damage to cars of these specific shippers declined materially. Seldom was any of the later destruction traceable to faulty carloading.

Car damage can be serious to both large and small food concerns. However, results can be most grave for companies of medium and small size. If during the course of a year, one out of many cars received from a concern is damaged, the receiver may withhold judgment or excuse the shipper. However, if only one car is received from a shipper and that is badly damaged, there may be no chance to show improvement the following year. There is no reason why a small shipper cannot load a car as adequately as a large concern.

Big companies have a real problem, too, especially those that operate a number of plants. Distributors report that shipments received from the same company, but arriving from different plants, show a wide divergence in carpacking efficiency. This, of course, is a reflection on the performance of local plant personnel.

Of all the companies packing products in fiberboard containers, those shipping wine, juice in tin, and fruits and vegetables in tin should have the greatest concern regarding carloading. For damage to cars loaded with these three commodities rank at the top of the list.

In addition to the AAR's aforementioned pamphlet on loading detailed literature on proved procedure for loading cars with fiberboxes may also be obtained from the Fiber Box Assn. in Chicago.

End (Resume reading on page 78)

One-Portion Packets

—Continued from page 90

Roseland, N. J. This contract packager has designed special equipment that stamps roll-fed foil into pockets, fills them with soluble coffee or similar products, and then forms 24 heat-sealed packets at a time. Speed is over 700 packets per minute.

Recently developed by this firm is a new machine for packaging salt and pepper in a 2-in-1 packet.

The machine takes 13½-in. wide, roll-fed, 3-mil acetate sheet and horizontally feeds it to a reciprocating-type pocket-forming device with two rows of ten electrically heated female dies. With each stroke of the pocket-former, ten 1-in. square compartments (for salt) and the same number of ½x1-in. pockets (for pepper) are stamped out.

SEALTITE SYNCHROMATIC

- Uses any standard gusseted paper bag.
- Fills, settles and seals 30 to 50 bags per minute.
- Delivers a square, flat-topped sift-proof package.
- Cost reductions up to $500 per month per machine reported by users.

Write for information

CONSOLIDATED PACKAGING MACHINERY CORP.

BUFFALO 13, NEW YORK

Rheemcote Poster Drums

Give Sales Producing "Family Identification"

to *new* CALIFORNIA OIL COMPANY Product

To introduce its *new* RPM 10-30 Special Motor Oil, The California Oil Company supplemented usual types of advertising with a colorful display designed to help win quick public recognition and acceptance for this new product.

An attractive, new four-color package design was developed. This design is featured on all RPM 10-30 packages from one-quart cans to 55-gallon drums.

This "family" of packages displayed in pyramid form at thousands of service stations throughout the East has helped California Oil quickly establish recognition and acceptance for this new motor oil.

Reproduction on large containers of the same design that appears on small packages is made possible by the exclusive Rheemcote lithograph process with which any design can be reproduced on drums up to 55-gallons in capacity.

You can use this powerful new advertising medium effectively. We will be glad to discuss the matter with you, or send you a colorful booklet which describes the sales possibilities of this important new medium.

Sell as you ship with Rheemcote Drums

RHEEM MANUFACTURING COMPANY

World's Largest Manufacturer of Steel Shipping Containers

RICHMOND, CALIFORNIA • SOUTH GATE, CALIFORNIA • HOUSTON, TEXAS • CHICAGO, ILLINOIS
NEW YORK, NEW YORK • NEW ORLEANS, LOUISIANA • LINDEN, NEW JERSEY • SPARROWS POINT, MARYLAND

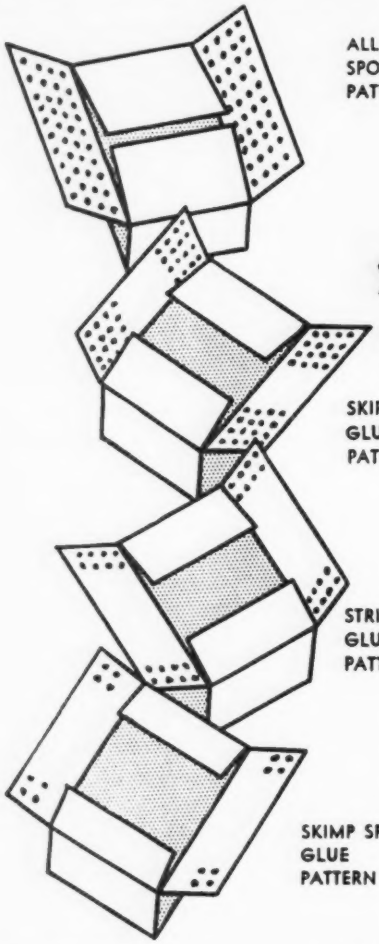
WE'LL BE AT THE NATIONAL PACKAGING EXPOSITION,
ATLANTIC CITY
APRIL 5-8, 1954, BOOTH #205-207

PACKOMATIC
PACKER-GLUER

THE ONLY ALL NEW SHORT CASE SEALER

Applies glue and seals all types of paper cases

APPLIES GLUE IN SPOT PATTERNS

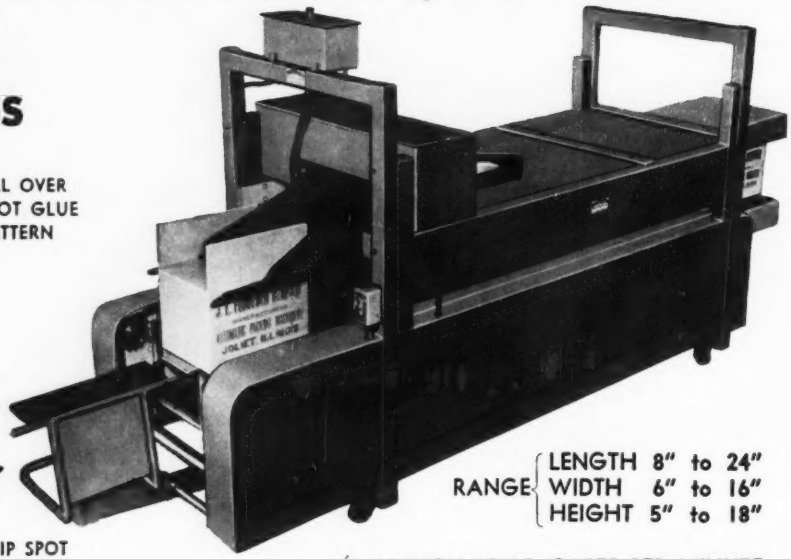


ALL OVER SPOT GLUE PATTERN

SKIP SPOT GLUE PATTERN

STRIP SPOT GLUE PATTERN

SKIMP SPOT GLUE PATTERN



RANGE { LENGTH 8" to 24" / WIDTH 6" to 16" / HEIGHT 5" to 18" }

SPEED { 8 12-INCH-LONG CASES PER MINUTE / 4 24-INCH-LONG CASES PER MINUTE }

The Packomatic Packer-Gluer is intermittent in operation. The operator packs the case on a packing table and moves it slightly forward, where it contacts a starting trip. All other operations are automatic.

Glue applying system is ALL NEW. By applying glue to the outer case flaps in spots at ¾" centers each spot has the advantage of being aerated around its entire circumference, allowing the glue to spread and become absorbed much faster than when it is applied in an all-over design where the roll applying method is used. Spot application of glue makes a faster, tighter adhesion.

The Packomatic Packer-Gluer occupies less than 30 square feet of floor space; has fewer moving parts than any sealing equipment on the market.

Applies glue to inner surface of outer flaps while flaps are in a vertical position

---

J. L. FERGUSON CO.
JOLIET, ILLINOIS

NEW YORK - CHICAGO - BOSTON - CLEVELAND - DENVER - LOS ANGELES - SAN FRANCISCO
SEATTLE - BALTIMORE - NEW ORLEANS - TAMPA - PORTLAND

Sheet then continues to two 100-lb. capacity stainless steel hoppers—one holding salt and the other pepper. As the sheet reaches the first hopper it is raised so that the larger row of pockets is flush with ¾-in. dia. nozzles. At this point, an oscillating gate below a volumetric filling device opens to permit lg. portions of salt to drop through nozzles and into pockets.

This process is repeated for pepper, except that only ¼g. portions are measured out in the second row of ten pockets.

Top web of printed, clay-coated sulfite sheet with a specially formulated thermoplastic coating is fed from another roll and over the filled pockets. Both top and bottom webs then go to the heat-sealing unit. Here, reciprocating-type, electrically heated, thermostatically controlled dies seal the packets. A corner of each packet is then machine-perforated for easy opening and shake-dispensing.

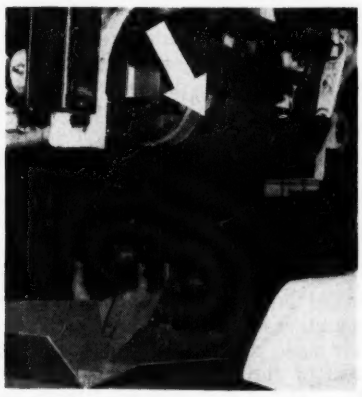
Double web then passes under seven 6-in. dia. vertical indexing rolls that feed it to the slitters. These comprise a series of rotary knives (10) that slit the double web lengthwise into single strips of packets and trim excess material from edges of the web. Individual combination salt-pepper packets are cross-cut from single rows by a guillotine-type knife. Packets are then hand-packed 50 to a carton. Speed of the line is 300 salt-pepper packets per min.

End (Resume reading on page 92)

24 Low Cost Devices

—*Continued from page 98*

a stop mechanism synchronized with the pusher. Stop is disengaged to permit another case to advance when the pusher is in retracted position.



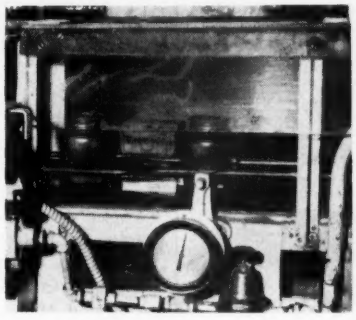
Protects Worker

22 The end of the case loader, beneath which operator sits, presents jutting bolts and sharp angles against which the worker might inadvertently bump her head. There is now scant likelihood of injury from this source, since the area is now shielded by a curved metal plate cushioned with a sheet of sponge rubber.

Shear-Pin Selection

23 Another accident-prevention device avoids severe damage to the case unloader. Provided originally on the drive assembly was a shear-pin made of ¼ in. bar stock positioned 1½ in. out from the shaft center. On occasions, damage resulted to the unloading machine mechanism before this heavy-stock pin was sheared.

Now located 1½ in. out from the shaft center, a ⅜ in. pin, made of round cold-rolled steel replaces the former pin. Any overload cuts this pin clean before damage can result.



Over-All Safety

24 From the time jars leave the twist cleaner—while they are in the filling area and until they arrive at the jar-lip gluing station—both workers and containers are protected from broken glass. Conveyors are canopied by clear sheet-plastic. The filler front is likewise shielded. Visibility is not impaired yet protection is assured.

Throughout the area where glass from a broken jar might strike operator or enter another container, protection is provided by this tunnel constructed with plastic top and sides. Latter are hinged to permit access to equipment for cleaning and maintenance or repair.

Since operators no longer need to be alert to spot a down jar or relieve a congested area, they are not distracted from their major responsibility, which they can now perform with maximum efficiency. Since jar breakage has been minimized, product loss is nil and repairs are seldom required. Now, due to the many line safeguards, very few minutes of the day are lost to down-time, therefore production is close to 100% of line capacity.

End (Resume reading on page 101)

ROBO-LIFT

HANDLES FOOD PRODUCTS

GENTLY

NO DIGGING
NO SCOOPING
NO SPILLING
OR
BREAKING

Standard Model A-1070 with 8 cu. ft. hopper. Stainless Steel in contact with product.

- Gentle vibratory motion handles many dry products . . . Drugs, confections, foodstuffs, chemicals, pharmaceuticals, etc.
- Product touches only stainless steel.
- Standard hopper shown is not integral part of conveyor, can be made portable.
- "No-spill" buckets invert to discharge. Angle of discharge variable.
- All parts easily accessible. Entire conveyor can be enclosed if desired.
- Many variations of basic model possible.
- Save labor, time, floorspace.
- Preserve fragile products from damage.
- In use by Beech-Nut, Buitoni, Kellogg, Kraft, Lipton, Post Cereals, Brach, Rockwood, Sharpe and Dohme, Safeway Stores, Lance, Inc., A. & P., Salada Tea Co., Campbell Soup, and many other leaders.

MANY DIFFERENT MODELS

Write for descriptive literature on Robo-Lift Bucket Elevating Conveyor and also the Robo-Lift Tray Elevating Conveyor.

Capacity Range up to 25 cu. ft. per minute.

Counsel
MACHINE COMPANY, INC.
8 HATHAWAY STREET WALLINGTON N J

BEE-LINE
to better labeling

THE TAYLOR-REED CORPORATION

GLENBROOK, CONNECTICUT

September 18, 1953

Economic Machinery Company
Division of Geo. J. Meyer Manufacturing Co.
Worcester 3, Massachusetts

Gentlemen:

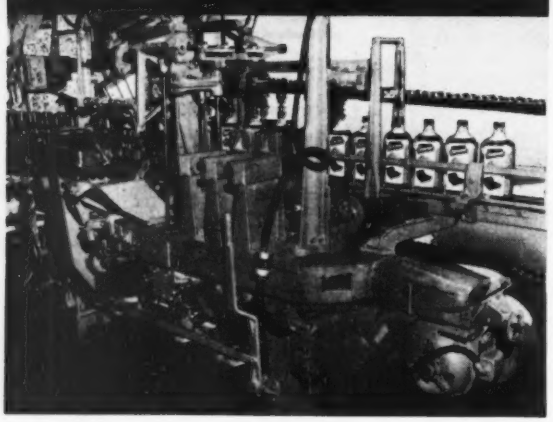
I want to tell you how delighted we are with the Bee-Line Labeler. It is doing a very nice job for us with the greatest of ease. Your help in getting it to us in such a hurry was most appreciated, particularly since I realize it meant upsetting your normal production schedules.

The Bee-Line automatic labeler is important to us because it means so much more economy in manufacturing cost.

Sincerely yours,

THE TAYLOR-REED CORPORATION

Charles M. D. Reed,
President



Your glass packed products belong on the BEE-LINE. Send us samples of your containers and labels so we can submit complete recommendations, layouts and production and cost estimates covering the best Labeler in the World for you—the WORLD Automatic *Bee-Line* Labeler.

See the WORLD Automatic BEE-LINE Labeler and the WORLD Automatic Cellulose Banding Machine at the PACKAGING EXPOSITION, *BOOTH 355*

WORLD LABELERS

ECONOMIC MACHINERY COMPANY
54 FREMONT STREET, WORCESTER 3, MASS.
Division of GEO. J. MEYER MANUFACTURING COMPANY
CUDAHY, WISCONSIN, U. S. A.

Kraft's Package Lab

—*Continued from page 87*

long at room temperature. Rather than admit defeat and then specify display of the product in already-crowded refrigerated display cases, the laboratory developed a non-oil-staining carton with an improved printing surface.

On the other hand, when a problem came up over an advertised recipe telling how to use caramels to make coated apples, the story was different. Housewives complained of the tedious job of stripping wraps from each caramel. Yet a 1-lb. caramel bar proved difficult to melt into a sauce, and caramel stuck to the knife, when one tried to slice it for quicker melting. So caramel packaging remained the same.

A revolutionary move on the part of the company—putting up foods in portion-controlled packages—was the outcome of basic requirements in food handling by the restaurant and institutional trade.

Now being packed are jams and jellies (½- and 1-oz. units), honey and cranberry sauce (¾-oz. units), and table syrup (1¾-oz. units).

Advantages of the new packages are low cost, inventory control, kitchen-labor savings, product-protection, purity.

Designed for one-time use and easy disposing, the portion-control package is machine-formed from a special vinyl sheet. Developed by the packaging laboratory, it was recommended because it is compounded of inert materials compatible with all food products. Moreover, it is thin, light in weight, strong, durable, and heat-sealable.

Savings are reflected in better control over institutional inventories and in abolishing the institutional consumer's wasteful portioning out of foods from large to individual-service containers. Quality is assured inasmuch as foods are fully protected in sanitary, sealed containers.

Several years of research and development went into the perfection of the machine, facilities, and methods to form and then fill and seal packages at production-line speeds.

There are no limitations to package sizes and shapes that the new forming-filling-sealing machine can turn out; nor as to foods that thus can be portion-packed.

Portion-control packaging of foods appears so broad that it is difficult to forecast the types and amounts of foods likely to be offered in this manner. And there are no reasons why this specific technique can't be broadly applied.

Significant, too, has been another recent packaging development involving years of research—a new method for continuously producing 8-slice, ½-lb. heat-sealed, coated cellophane packs of cheese.

Melted cheese coming from the pasteurizer is sheet-formed on a chilled rotating drum. Leaving the drum at the rate of 150 lb. per min., the ⅛-in. sheet is cut into 3½-in.-wide ribbons by a series of revolving knives. Ribbons are accumulated in stacks of eight on a conveyor as they continue to a cross-cutter that slices through stacks to form eight 3½-in. squares (½ lb.).

About some of the older packaging improvements:

First Kraft packaging development took place in 1917—a year after the founder, Mr. J. L. Kraft obtained a patent for blending and pasteurizing natural cheese—when processed cheese was packed into tins and thus shipped to Europe without refrigeration and without spoiling.

The company again made packaging history four years later when 5-lb. loaves of cheese were foil-wrapped and packed in wooden boxes. Wood then gave way later to the more economical paper boxes on high-speed lines.

About 20 yr. ago, the company introduced decorative, re-use tumblers for 5-oz. amounts of cheese spreads. The year after, sales shot up 601% over the last year that spreads were packed in paper cups.

TOPS IN QUALITY
COMPETITIVE IN PRICE

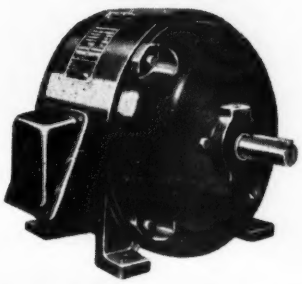
SPECIFY THE
New DIEHL
TYPE "D" MOTOR

"DESIGNED FOR MOUNTING IN *ANY* POSITION"

Diehl

...here's 12 reasons why

- Most Advanced Slot Insulation
- Machine Fitted Stator
- Rotor Keyed to Shaft
- New High Dielectric Insulated Stator Windings
- Permanently Numbered Leads
- Conduit Box, An Electrician's Delight
- Centrifugally Cast, High Density Rotor Windings
- Rugged Stress-Relieved End-Covers
- New Pre-lubricated Heavy Duty Ball Bearings
- Locked-in Ball Bearing
- Dual Ventilation System
- Extra Strong Cast Iron Frame



Designed and engineered for more efficient performance. Smaller in size, lighter in weight and quieter in operation.

Consult our engineers before writing your specifications and get the benefit of 68 years of experience in the design and manufacture of general and special purpose motors

Diehl motors will still be available in old NEMA Standard frame sizes for interchange and replacement.

DIEHL MANUFACTURING COMPANY
Electrical Division of THE SINGER MANUFACTURING COMPANY
Finderne Plant, SOMERVILLE, N. J.

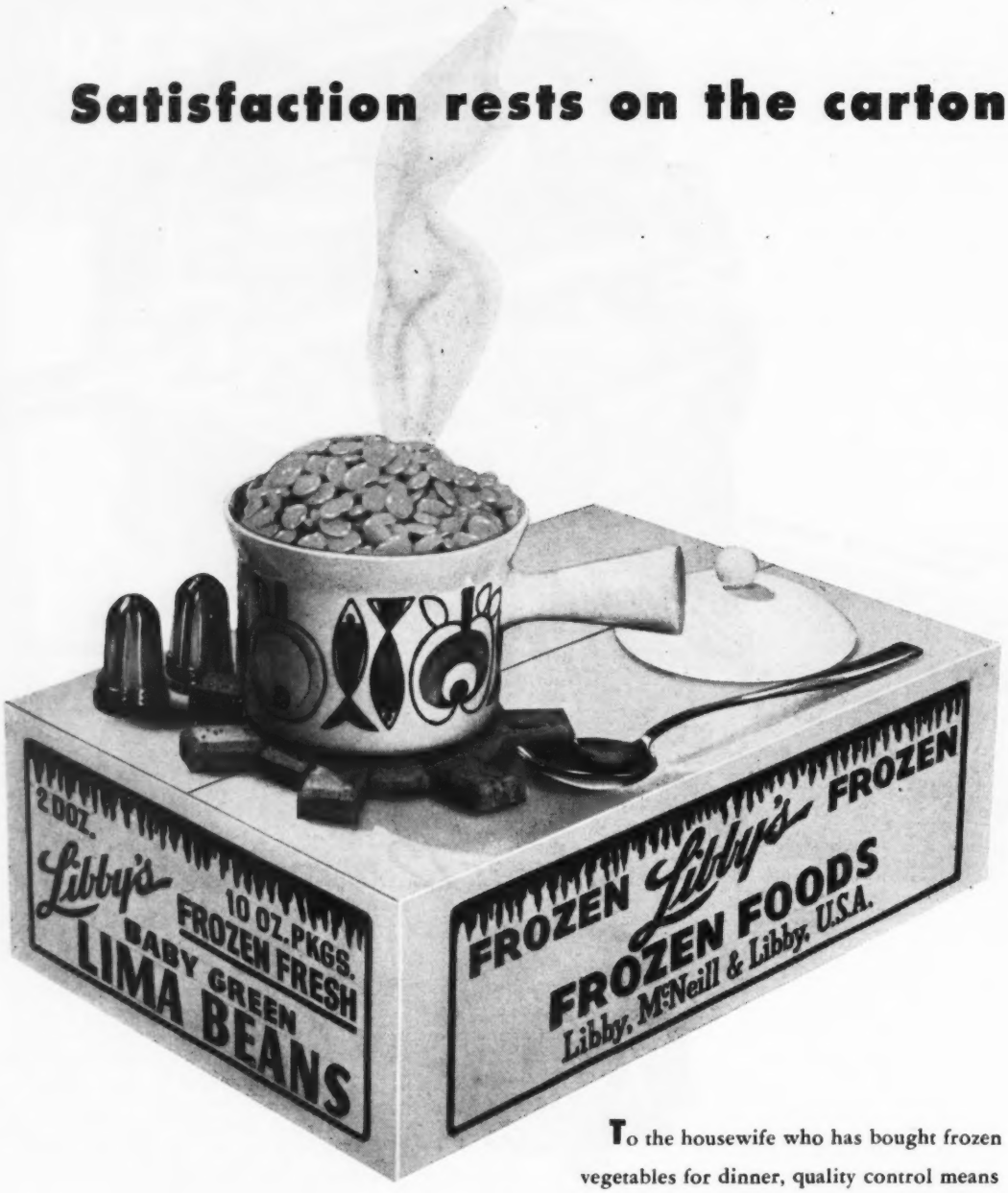
Please send me the following bulletins

☐ New Type "D" Motor Bulletin No. FE 3304
☐ Consolidated Catalog & Price List No. FE 3310

Name_____
Company_____
Street_____
City_____ State_____

INTEGRAL AND FRACTIONAL HORSEPOWER MOTORS ARE AVAILABLE IN A WIDE RANGE OF TYPES AND SIZES

Satisfaction rests on the carton



To the housewife who has bought frozen vegetables for dinner, quality control means simply that she can trust them to look good and taste good when she serves them. One of the safeguards upon which she depends, probably without ever thinking about it, is the shipping carton that carries her vegetables from packer to retailer. Libby, McNeill & Libby is among the many food processors for whom Union corrugated shipping containers continue to do an unheralded but important job.

TRADE MARK UNION
INTEGRATED PLANNING
INTEGRATED PRODUCTION

UNION BAG & PAPER CORPORATION

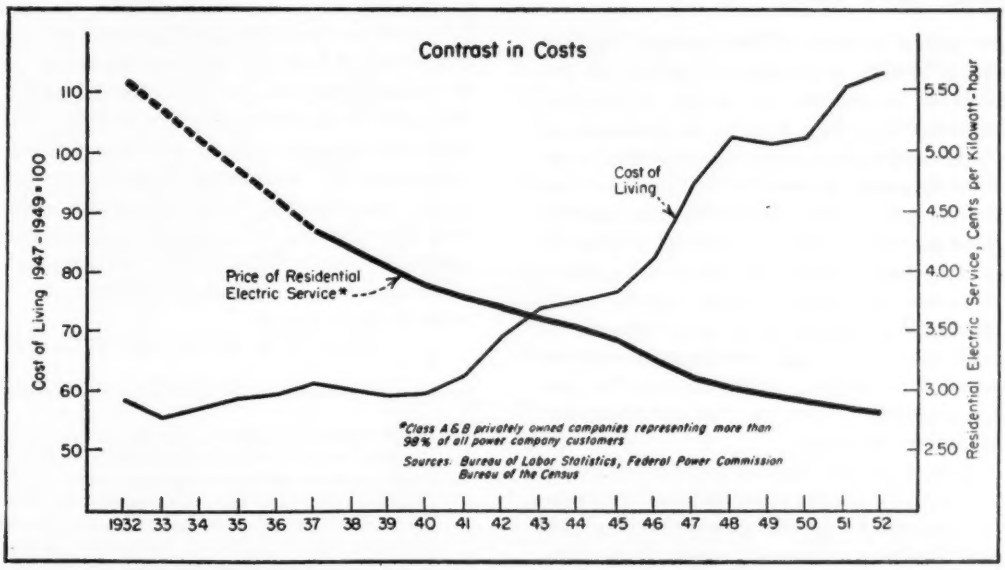
CORRUGATED CONTAINER DIVISION • Box Plants: Savannah, Ga., Trenton, N. J., Chicago, Ill.

Eastern Division Sales Offices: 1400 E. State St., Trenton 9, N. J. • Southern Division Sales Offices: P.O. Box 570, Savannah, Ga.
Western Division Sales Offices: 4545 West Palmer, Chicago 39, Ill. • Executive Offices: Woolworth Bldg., New York 7, N. Y.

A 20-YEAR RECORD...

The Electric Power Companies' Case for Public Confidence

An economic study of the record of the investor-owned electric power companies of the United States over the past twenty years underwrites their claim to public confidence today. A key factor of this record is set forth by the chart in the middle of this page. This shows that while the cost of living as a whole has almost doubled, the average price of electric energy for residential use in the United States has been cut in half.



The average prices of industrial and commercial power also are much lower than they were twenty years ago.

Such a study confirms the record on other key accomplishments of the electric power companies during the past two decades.

They have not failed, either in peace or war, to meet the nation's rapidly expanding electric power requirements. In paying tribute to the performance of these companies during World War II, J. A. Krug, Director of the Office of War Utilities, said, "Power has never been too little or too late." The same can be said for the entire period of the past twenty years.

To be ready with enough power – on time – the electric power companies have expanded their production fourfold since 1933. This has required an investment of over $17 billion in new facilities. To raise the funds for this investment they have enlisted the participation of about 3 million direct stockholders. Through life insurance companies, banks and similar institutions, about 90 million Americans – more than half of the nation's total population – have become investors in electric power companies. By thus relying on private investment for their expansion, the power companies have provided their

plant and operating equipment without burden on the taxpayer.

In addition, the investor-owned companies have paid about $12 billion in taxes to various governments – national, state and local – over the past twenty years. Unlike government-owned and -operated systems, they have received no public subsidies. When taxes and subsidies are taken into account, the rates for electricity charged by the investor-owned companies have been as low as, or lower than, those charged by government-owned and -operated systems.

Many Americans do not appreciate the job that the power companies have done over the past two decades. That is due, in part, to the public memory of financial abuses by some utility holding companies during the 1920's. This memory obscures a clear and unprejudiced view of the progress since those days. And some of the all-out advocates of reliance on government rather than on regulated private enterprise for the development of our power resources do their best to keep this memory of the past alive in the present.

An Impressive Case

Some special cases of electric power development may involve problems for which the investor-owned companies are unable to provide full solutions. This may be true, for example, of some large multiple-purpose projects that combine electric power generation with related developments such as the improvement of navigation, flood control and the irrigation of arid lands. Some of the economic and administrative problems imposed by such projects are not well adapted to effective handling by private enterprise. Flood control and the improvement of navigation, for example, usually involve the provision of much costly service over and above the cost of producing power.

It is true, however, that in some cases development of the electric power side of multiple-purpose projects by private enterprise may well be more feasible than would appear from statements by some government power advocates. And the record indicates that even in those projects on which both the power generation and the other services are handled by public authority, it may well be desirable to have the investor-owned companies assume the transmission and distribution functions.

Our study of the record of the investor-owned and -operated companies over the past twenty years has led us, of course, behind the statistics that bear on the wisdom of giving them a priority in the development of our power resources. It reveals that these enterprises are manned by people who, through lifetime experience, are peculiarly conversant with the needs of the communities they serve. They have given the consumer notably good service while conforming to standards set and enforced by public regulatory commissions. They have won the confidence of the investing public. By their nature and their experience they are competent to handle any power program that can be demonstrated to be economically sound.

The Paramount Public Interest

By their economic performance during the last twenty years, the electric power companies have earned the confidence of the public. By relying on these companies to meet its electric power requirements the public will fully protect its economic interest in ample and efficient service at fair prices.

That is where our study comes out. Our findings do not touch the political consideration that private operation of electric utilities under public regulation is a safeguard against further concentration of both political and economic power in a federal government that already commands too great a concentration. But if these findings make an economic case for preferring power development by tax-paying business as against power development by governmental agencies, they clear the way for an appeal to the paramount public interest in safeguarding our personal and political freedoms against the further encroachment of government.

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments that are of particular concern to the business and professional community served by our industrial and technical publications.

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Donald C. McGraw

PRESIDENT

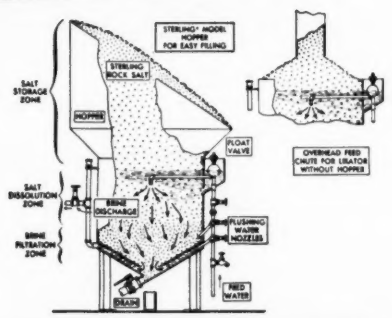
McGRAW-HILL PUBLISHING COMPANY, INC.

COMPARE

LIXATE BRINE vs. ORDINARY BRINE

	LIXATE BRINE	ORDINARY BRINE
Salt Storage	Above or near the Lixator hopper	In separate piles or bins
Brine Storage	None. Made as needed	In separate vats
Handling Costs	Zero	Cost of labor
Measurement	100% accurate	Guesswork
Saturation	100%	Haphazard
Preparation	Automatic	Cost of labor
Distribution	Piped	Cost of labor

the LIXATE* process for making brine



HOW LIXATOR WORKS

In the dissolution zone—flowing through a bed of Sterling Rock Salt which is continuously replenished by gravity feed, water dissolves salt to form 100% saturated brine. **In the filtration zone**—through use of the *self-filtration* principle *originated by International Salt Company,* the saturated brine is thoroughly filtered through a bed of *un*dissolved rock salt. The rock salt itself filters the brine. Nothing else is needed.

INTERNATIONAL SALT CO., INC.
SCRANTON, PENNSYLVANIA

SALES OFFICES: Atlanta, Ga. • Chicago, Ill. New Orleans, La. • Boston, Mass. • St. Louis, Mo. Newark, N. J. • Buffalo, N. Y. • New York, N. Y. Cincinnati, O. • Philadelphia, Pa. • Pittsburgh, Pa. Richmond, Va. • ENGINEERING OFFICES: Atlanta, Ga. Chicago, Ill. • Buffalo, N. Y. *Reg. U. S. Pat. Off.

MAKING BRINE need no longer be complicated, inaccurate, costly. Now, thanks to the LIXATE Process, developed by the International Salt Company, you can have brine *automatically*—where you want it—when you want it—*at the turn of a valve.*

Because this pure brine is *always* 100% saturated brine—because it *always* contains exactly 2.65 pounds of salt per gallon—your brine measurements are always exact—100% accurate.

Hundreds of companies have already saved thousands of dollars, have improved the quality of their products by installing the International Salt Company's *Lixate* Process. Let International's Industrial Division help *you.* Send the coupon below, today.

INTERNATIONAL SALT COMPANY, INC.
INDUSTRIAL DIVISION, Scranton 2, Pa.

I am interested in knowing what the *Lixate* Process can do for MY plant. Please have an International Industrial Engineer contact me as soon as possible. I understand there is no cost, no obligation.

FIRM NAME_____

ADDRESS_____

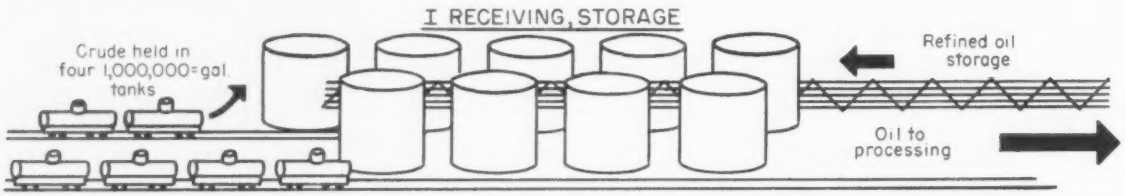
CITY_____ ZONE_____

STATE_____

MY NAME_____

MY TITLE_____

KEY process-area layout capitalizes on experience gleaned in sister plant at Sherman, Tex. I—Receiving and storage tanks, II—Separation, III—Winterizing, IV—Hydrogen process, V—Processing, VI—Packaging and office. Other buildings: Utilities, maintenance, and garage. Facilities may be expanded to north and south.



Edible-Oil Processing—'Raw to Package'

Giant new plant converts 12 tank cars of crude oil daily. Multi-product flexibility put on mass scale via these six interrelated process areas

ONE of the world's most prodigious and dexterous processors of raw vegetable oil is the modern-model operation recently launched at Jacksonville, Ill., by Mrs. Tucker's Products (Anderson, Clayton & Co.).

Both soy and cottonseed crude—bought mainly in the regional open market—arrive in company owned tank cars and are drawn-on continuously from four 1,000,000 lb. holding tanks. Adjacent tanks, totaling 26,000,000 lb. capacity, hold subsequently refined oil (Area I, drawing).

Crude is first pumped to the Separating Building (Area II drawing) for caustic refining and bleaching. Initial step is to proportion in NaOH (6,000 lb. at 18 deg. Baume is used per hour) to the oil, then mix, heat, and centrifuge off resulting soapstock. The latter, plus any saponified free fatty acids, is pumped at about 1,200 lb./hr. to tanks in an adjacent kettlehouse and subsequently sold to industry.

HERCULEAN QC JOB? True, you'd think it would take a horde of supervisors to get premium product in consumer sizes from this vast operation. But actually it's done with "small-plant aplomb and lucid simplicity"—as revealed in "Carload-to-Container Quality Control" (on p. 64).

Oil is next water-washed to dissolve remaining caustic and soap, which are then removed by secondary centrifuge. Traces of water are finally deleted in a vertical vac dryer.

After a 30-day holding, refined oil has fuller's earth proportioned to it, and the slurry is sprayed into a two-section, company-designed vacuum tower to remove entrained gases and moisture. Passage through a cloth filter press next removes color bodies and the clear oil is cooled.

Refined, bleached cottonseed oil for salad dressing is routed to the "Winterizing" Building (Area III) to repose in open tanks. This crystallizes-out stearine or any hydrogen saturated portion, which is removed by blowing the product under air pressure through filter press. The "winterized" oil is then ready for package.

Hydrogen for hardening refined oil is made in an automatic process (Area IV) that mixes piped-in natural gas with superheated steam and burns the mixture, over vertical catalyst tubes, at 1,600 deg. F.

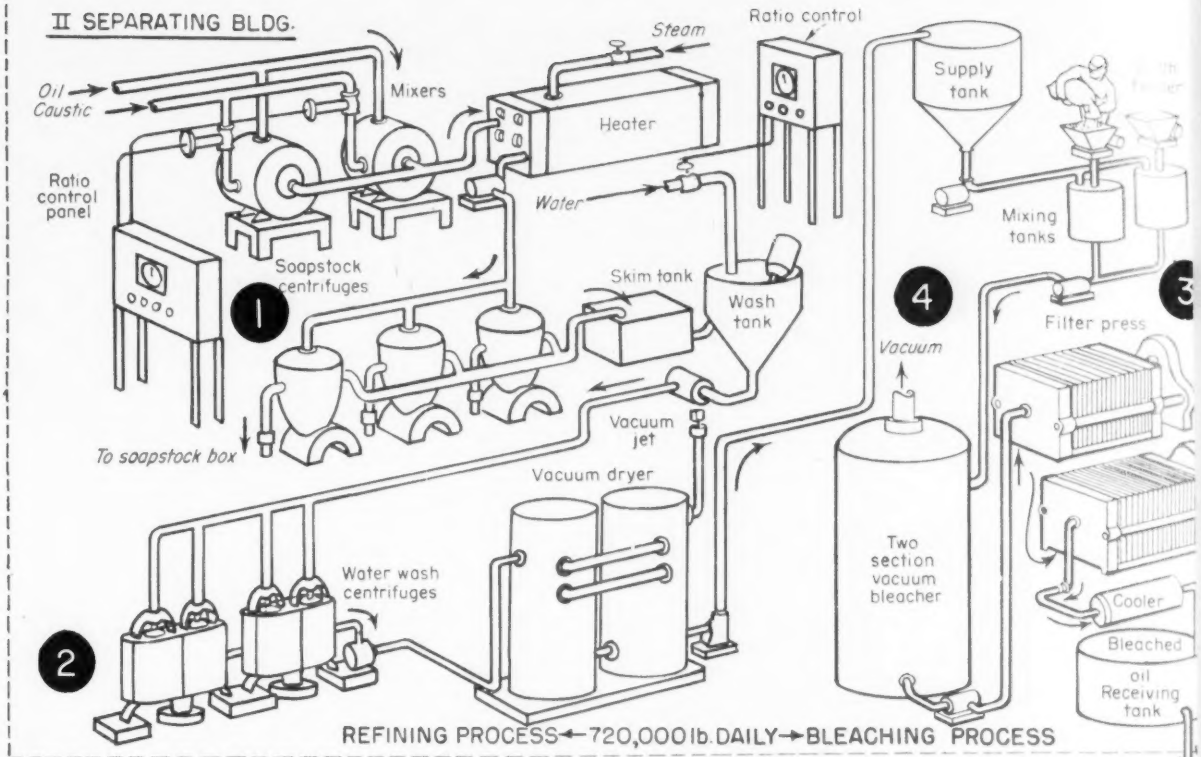
In the process building (Area V) this hydrogen is added to the oil, along with nickel catalyst, and the mixture goes into a closed, agitated vessel equipped with heating and cooling coils.

Hydrogenated oil is now run through a deodorizer to distill-off any remaining free fatty acids and odoriferous material. Held under 4 mm. Hg vacuum, this vessel moves the oil in automatic sequence over a series of Dowtherm and steam heated trays. Charges from the deodorizer are cooled, then filter-polished through paper backed by canvas.

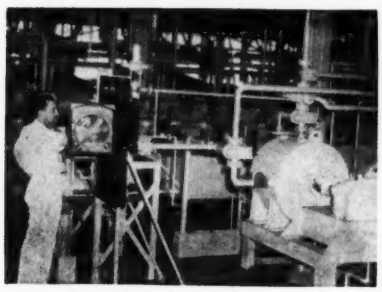
Process oil is incorporated into margarine in a tiled area in the Packaging Building (Area VI) through metered addition of buttermilk, culture, salt, vitamin A, and color in 1,000-gal. vats. After a 16 hr. set-up time, this mixture is chilled, texturized by a Votator "B" unit, and formed into slabs for printing, wrapping, and cartoning.

Oil for shortening, with necessary additives, is first precooled in a tubular exchanger, then passed through a Votator chiller, and finally through a Votator plasticizer, which proportions-in air to give product a creamy consistency. Filled into either cans or large drums, the finished shortening is held in a tempering room, prior to shipping, to stabilize its crystal structure.

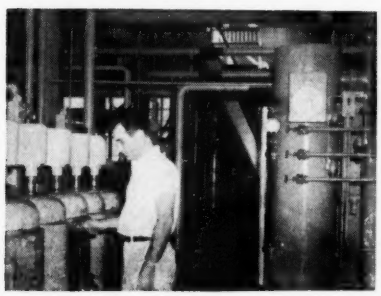
UNFOLD HERE



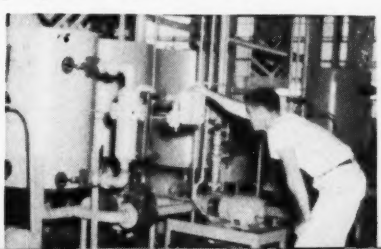
1 **RATIO** controller (left) proportions caustic to crude oil in mixers. Centrifuges remove soap.

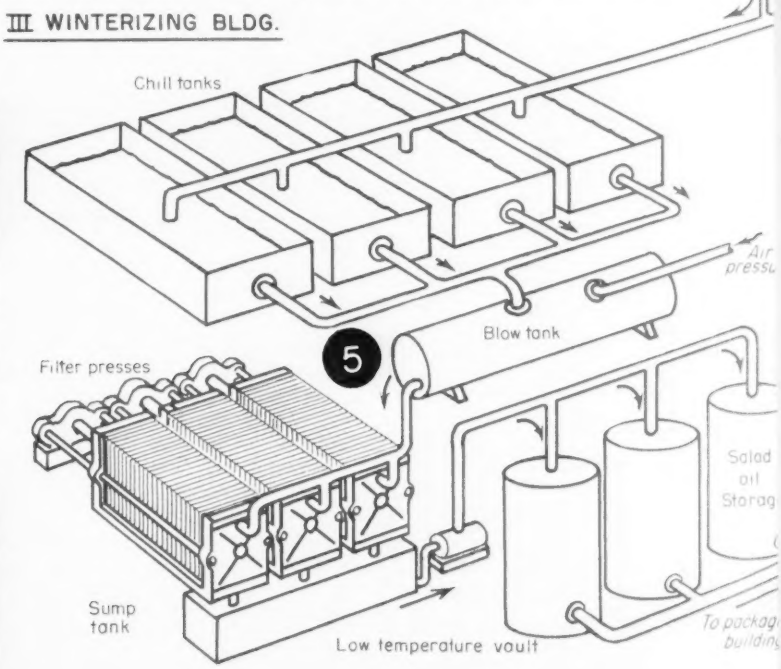


2 **TWIN** centrifuges (left) toss off wash water. Oil then goes through vac dryer (rear).

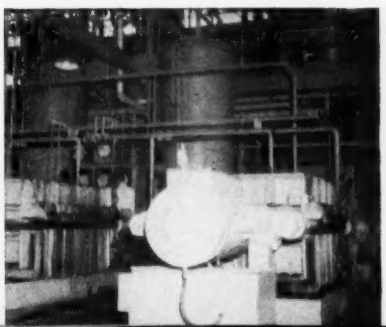


3 **REFINED** oil is mixed with fuller's earth in these slurry tanks, then pumped through vac bleach.

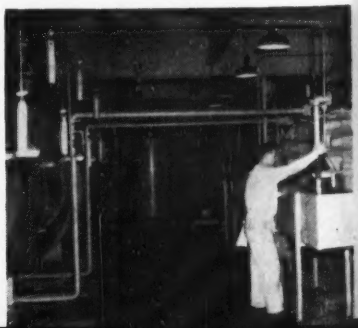


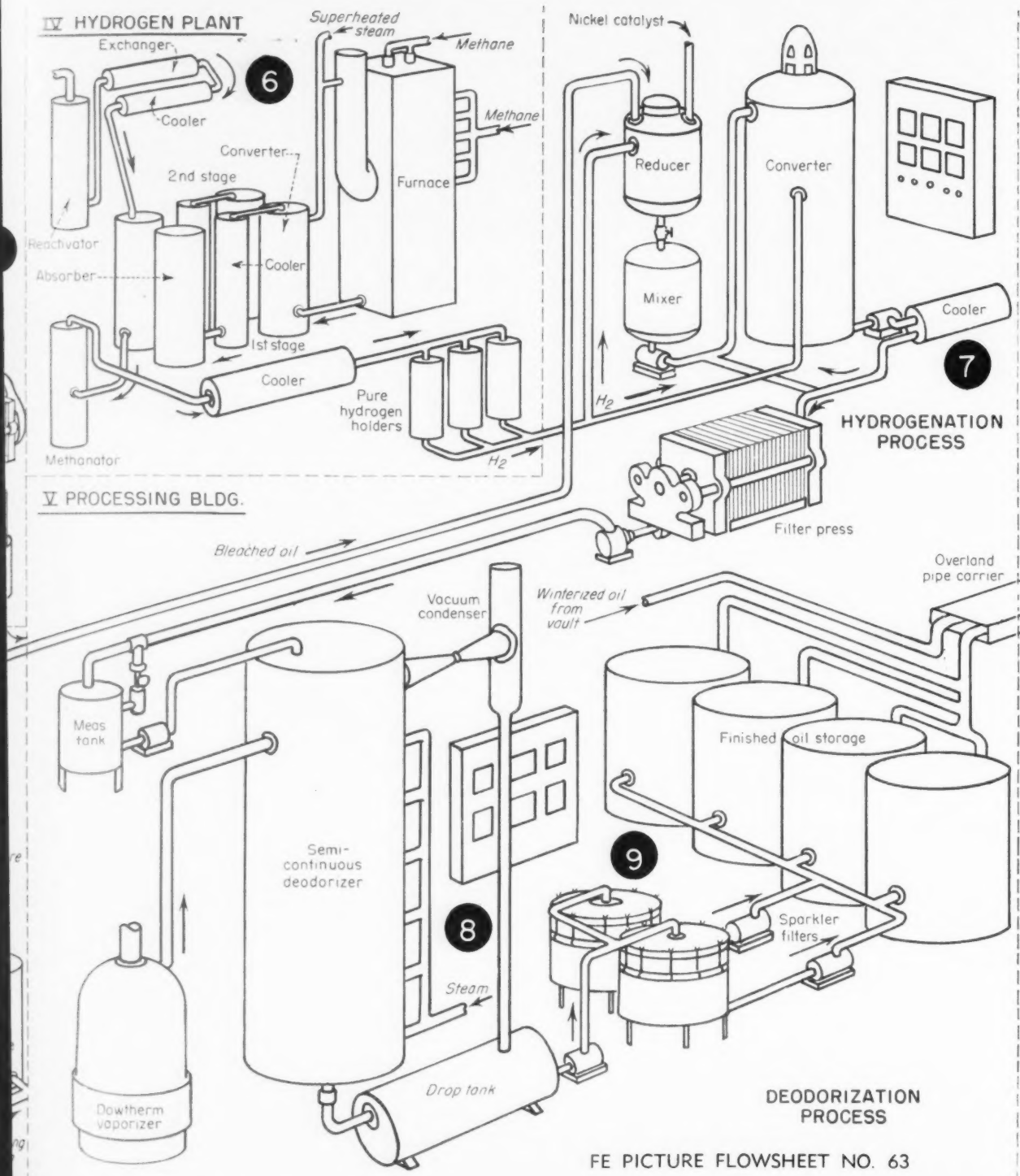


4 **CLOSED** filters remove clay-adhering impurities from oil. Note vacuum bleaching towers (rear).



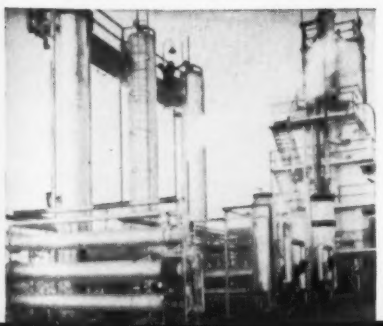
5 **PRESSURE** tank (left) forces through press filters (right) in a chilled winterizing vault.



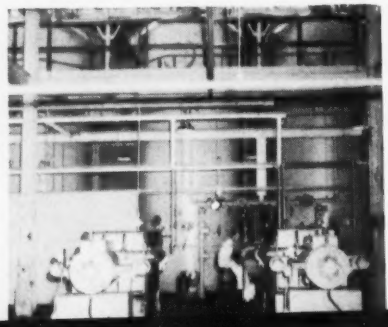


FE PICTURE FLOWSHEET NO. 63

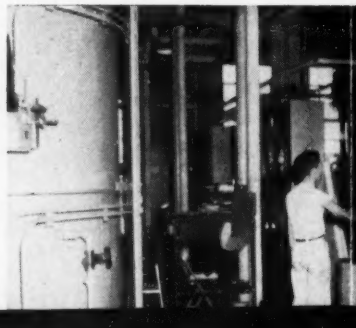
6 **HYDROGEN** gas is made from methane in unhoused process. Furnace (right) runs at 1,600 deg. F.

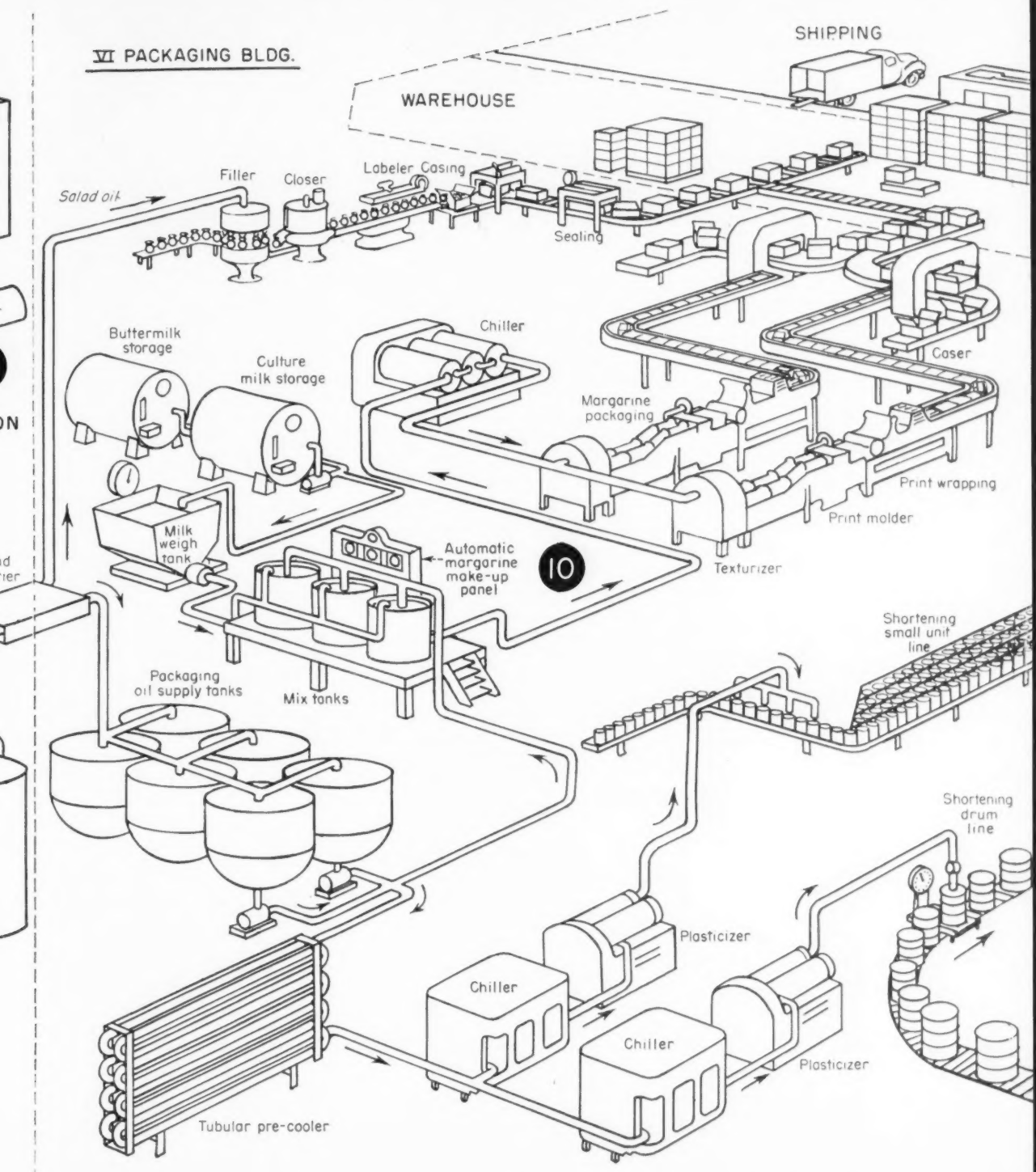


7 **HUGE** converters (rear) pass hydrogen through heated, agitated oil. Next, product is filtered (foreground).



8 **AUTOMATICALLY** controlled sem odorizing unit (left) distills off f and remaining odors from the produc

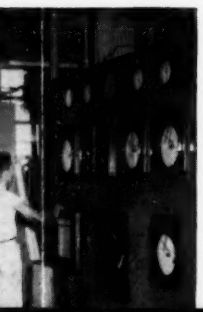


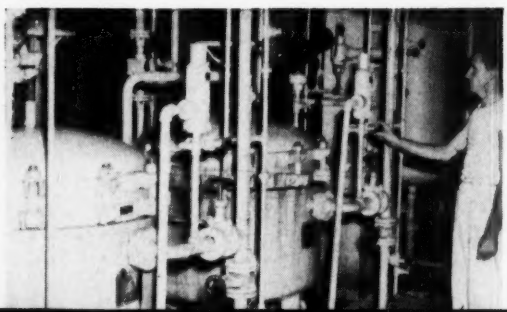


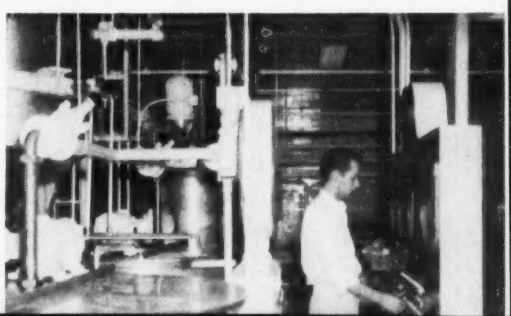
d semi-continuous de-
off free fatty acids
roduct.

9 **BARREL** filters give the deodorized oil a high, clear polish prior to use of the product in shortenings or margarine.

10 **MARGARINE** emulsion is made up and then blended in stainless steel vats (at left in photo). These aperations are automatic.

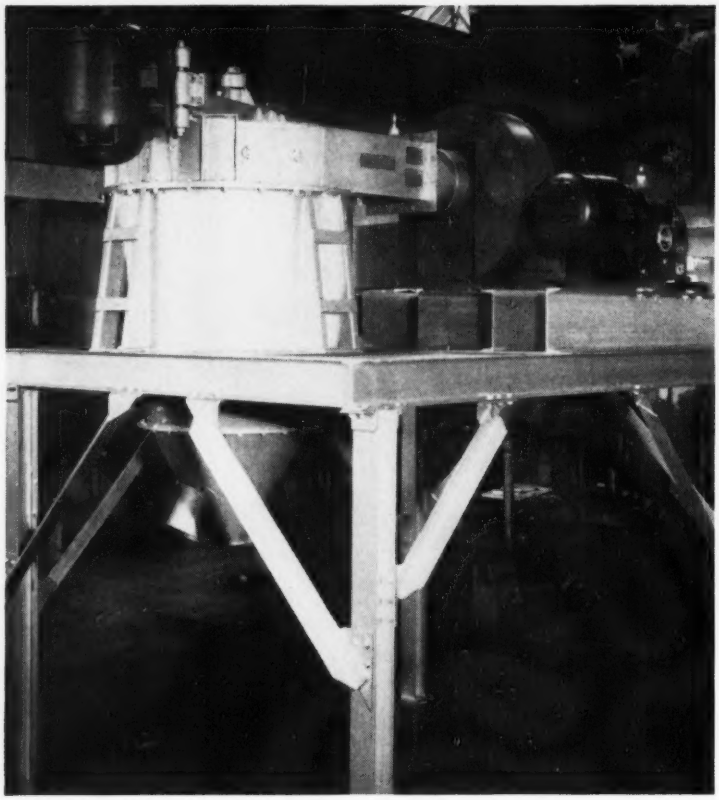






NEW TYPE STURTEVANT AIR SEPARATOR

Recovers Fines in Micron Ranges



Now the famous Sturtevant Whirlwind Air Separator, so widely used throughout industry for fast recovery of fines, has been specially designed to "pick-off" classified materials such as pigments, limestone fillers, plastics, oyster shells, etc., in micron sizes.

These highly efficient air separators select a continuously uniform product of desired fineness. Used in a closed circuit with grinding mills, they increase production, cut power costs.

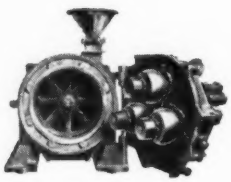
Large feed opening, rugged construction, ease of adjustment, low power consumption assure economy of operation and minimum upkeep. Write for further information.

STURTEVANT
MILL COMPANY
106 CLAYTON STREET
BOSTON 22, MASS.

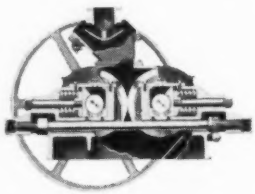
Designers and Manufacturers of:
CRUSHERS • GRINDERS • SEPARATORS
CONVEYORS • MECHANICAL DENS and
EXCAVATORS • ELEVATORS • MIXERS

OTHER STURTEVANT EQUIPMENT

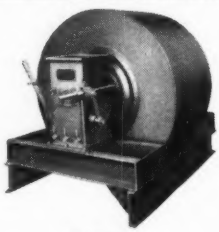
MICRONIZER® GRINDING MACHINE
A fluid jet grinding machine, the Sturtevant Micronizer speeds reduction of materials to low micron sizes. These jet mills are especially applicable in fields where a particle size in microns is desired.
Sturtevant Micronizer grinding machines are available in many sizes and capacities.



RING-ROLL MILLS
For medium and fine reduction (10 to 200 mesh), hard or soft materials. Very durable, small power. Operate in closed circuit with Screen or Air Separator. Open door accessibility. Many sizes. No scrapers, plows, pushers, or shields.

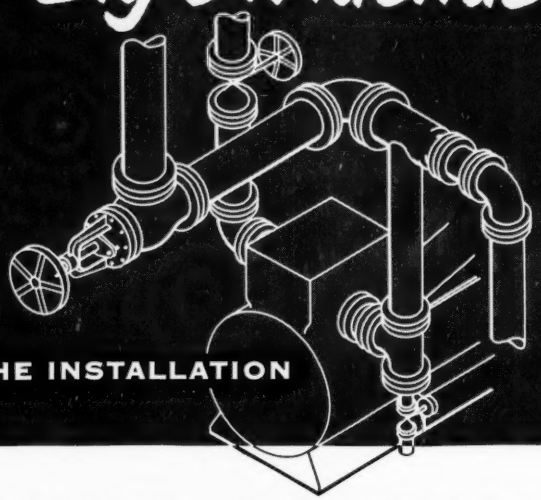


CRUSHING ROLLS
For granulation, coarse or fine, hard or soft materials. Automatic adjustments. Crushing shocks balanced. For dry or wet reduction. Sizes 8 x 5 to 38 x 20. The standard for abrasives.



BLENDER
Four-way mixing action assures a thoroughly blended product. Open-door accessibility permits easy cleaning. Available in many mixing capacities for ¼-ton per hour and up.

Thrifty Valve Buying in 1918 Still Paying Big Dividends



THE INSTALLATION

At the American Crystal Sugar Company's Rocky Ford, Colorado, mill where Crane 12-inch iron body angle valves control carbon dioxide to pumps supplying the gas for carbonation process.

THE CASE HISTORY

This CO_2 service requires valves of utmost dependability to protect process and equipment from damage. In the event of malfunction or failure of pumps, the valves must assure positive closure every time.

That's precisely the quality of performance Crane No. 353 valves have given in this service for more than 35 years. The mill's long inactivity between 75-day production campaigns hasn't made the job easier. Yet, these valves have never been out of the lines for repairs; they've remained on the job since 1918 with only routine maintenance.

Valves that set performance records like this aren't bought on price alone—it's quality that counts most. That's thrifty buying—still the only way of getting the best value.

VALVE SERVICE RATINGS

SUITABILITY: *Never failed in 35 years*

FEATURES: *Simplified design—easy to service*

MAINTENANCE COST: *None—Routine care only*

SERVICE LIFE: *Installed 1918—still O.K.*

OPERATING RESULTS: *Dependable CO_2 control*

AVAILABILITY: *Crane catalog item—No. 353*

THE VALVE

You can see the ruggedness and serviceability of No. 353 angle valves, but it's what's inside that counts most in their better performance. Choose these valves from the complete family of Crane 125-pound iron body globes and angles. It gives you the widest selection of patterns and types for steam, water, oil, and gas. See your Crane Catalog or your Crane Representative.

THE BETTER QUALITY...BIGGER VALUE LINE...IN BRASS, STEEL, IRON

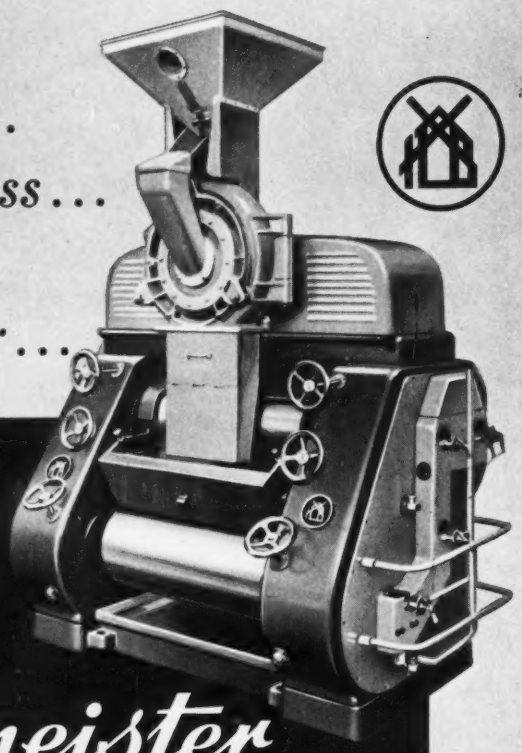
CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

For more information, use coupon on page 179.

New fineness...
new evenness...
in refining
Cocoa Liquor...



No operator needed!

WITH THE

Bauermeister MILL (TYPE K.W. 51)

The two top high speed rolls of this new Bauermeister Cocoa Liquor Mill are equipped with an automatic temperature control. An automatic regulator adjusts the flow of cocoa nibs into the disc mill to the proper amount the rolls can take. And a liquor feed arrangement, also automatic, between disc mill and refiner spreads the liquor evenly and prevents any separation of the cocoa butter. All these refinements result in an important labor saving. And when your cocoa liquor runs through the four vertical rolls, each equipped with efficient water cooling, you are sure of an evenly finished product-chocolate you'll be proud of. Send for catalog giving full information

GRINDING MILL has counter rotating slow speed centrifugal and grinding elements.

VERTICAL REFINER (4 rolls, water-cooled) of special chilled cast iron of uniform hardness and long life results in better and smoother crushing.

DELIVERY SCRAPER KNIFE (patent pending) special design, allows the knife to be used to the end without re-sharpening or changing.

MACHINE CUT HELICAL GEARS, running in oil bath, for smooth, quiet operation.

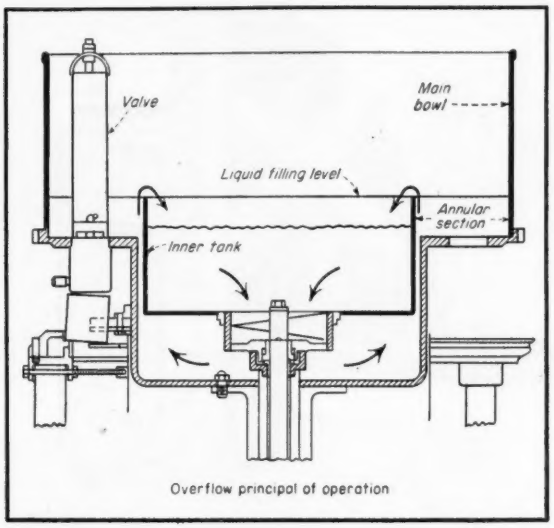
CONTROL INSTRUMENTS centrally placed, for easy supervision of internal operations.

GEVEKE & COMPANY, INC.

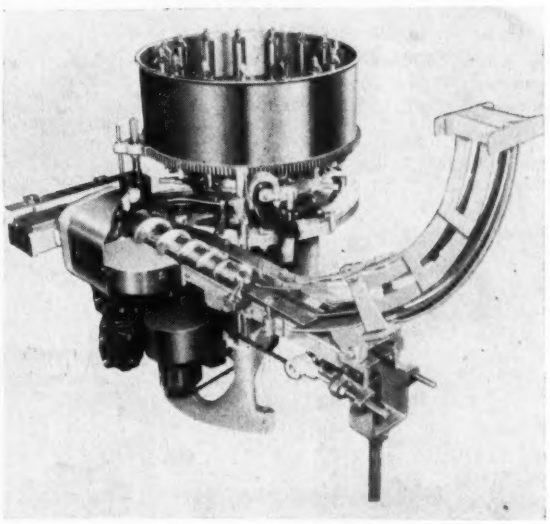
25 BROADWAY, NEW YORK 4, N. Y.

MANUFACTURERS' REPRESENTATIVES • SPECIALIZED MACHINERY AND EQUIPMENT • FOUNDED AMSTERDAM 1876 •

NEW EQUIPMENT & SUPPLIES



Overflow principal of operation



Unit Accurately Fills 300 to 325 Cans Per Minute

Accurate, high speed filling of liquid foods into cans is reported with use of this new 15-valve machine. Unit can be used for numerous liquids including brines, syrups, juices and light oils.

Speeds range from 125-150 cpm. with No. 404x700 cans to 300-325 cpm. with No. 202x314 cans.

New filling principle (see sketch) assures uniform, preset quantity of product in each filling tube prior to its being discharged into the can. Unit employs an open, inner tank centered within the main bowl. Level of this tank is adjustable. It can be raised or lowered within the main bowl by simply turning a single hand wheel regulator.

Valves are centered in annular section formed by the outer wall of the inner tank and interior of main bowl.

In operation, incoming liquid from the supply line is delivered to the inner tank. Liquid is withdrawn from the bottom of this tank via a pump and moved to the annular section. It is then circulated in this section until its level reaches the height of the inner bowl. Wall of the inner tank forms a dam over which the excess liquid falls, thereby leaving a constant liquid level in the annular section. Valves are designed so that they will fill themselves precisely to the liquid level in the annular section.

Filling valve has three components: A movable piston, a stationary valve body and a measuring tube. Each valve is located beneath its measuring tube. While filling, the tube is closed to the can by a plunger cut-off to assure a no-drip operation. Conversely, when discharging liquid into the can, the measuring tube is closed to the liquid contained in the filling section. Only a few seconds are required to remove and dismantle each valve for cleaning purposes.

Another design feature of the filler is a bankable can track which prevents spilling of liquid by centrifugal force at high speed. A "no can-no-fill" device is also furnished. All contact parts are made of stainless steel and copper-free nickel alloys. The unit measures 43 in. long, 85 in. wide, and 57 in. high to can chute and 50 in. maximum height to top of bowl.—*Canning Machinery Div., Food Machinery and Chemical Corp., San Jose, Calif.*

Circle 147A on Reader Service Card

Retort Control System Is Highly Flexible

Any degree of automation in retorting desired by the canner can be attained with use of a new add-a-unit control system.

It consists of a basic controller, which can provide single control (temperature) or dual (temperature and pressure); and a subpanel to which units are added for any type or degree of control up to, and including, fully automatic.

Subpanel units consist of a cook timer, a cool timer, a cook selector and an automatic venting unit. Any or all of these components and their related solenoid valves may be added as process needs develop and as greater degrees of control are deemed necessary and desirable.

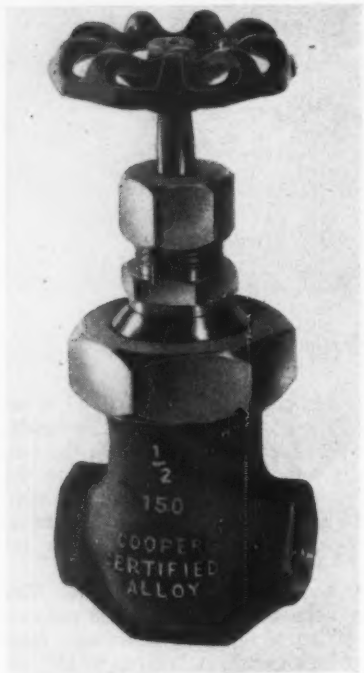
Adding a cook timer to subpanel permits operator to dial desired cooking time, the timed period starting when retort temperature is up to its pre-set value and ending by automatically closing the steam valve.

Adding a cook timer too, makes entire cycle (excluding venting on steam cooks) completely automatic for any one of the three basic types of cook. If desired to handle different types (steam, water, and steam cook with pressure cooling) from

same control system, a cook selector switch is added. Lights signal progress of cycle.

Units are easily installed by purchaser; no special tools or skill required. Wires are coded and terminals clearly marked.—*Foxboro Co., Foxboro, Mass.*

Circle 147B on Reader Service Card



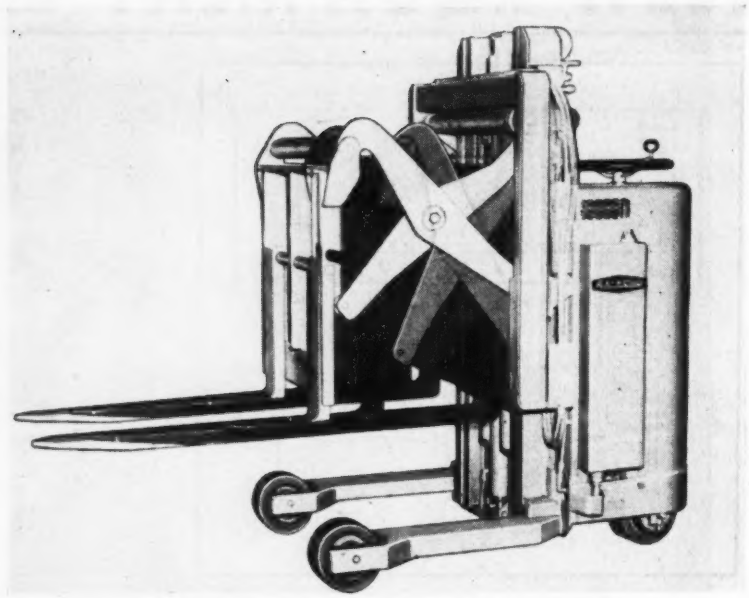
Stainless Steel Valve For Liquid Foods

This new stainless steel valve is designed especially to meet the rigid service requirements of food processing. It features a rugged, compact steel cast body and guided precision cast disk.

Designated Fig. 3151, this union bonnet, inside screw, non-rinsing stem valve is available in ½, ¾, and 1 in. sizes. Most exterior surfaces, with exception of shell cast body, are polished and provide a sanitary appearance.

Valve is designed with non-rinsing stem to minimize product contamination. Large stuffing box and accurately machined disks and seats minimize possibility of leakage. Heavy wall sections resist corrosives. Disks are cast in V2B, new patented, high hardness, gall and corrosion resistant alloy.—*Cooper Alloy Foundry Co., Hillside, N. J.*

Circle 148A on Reader Service Card



Compact Fork Truck Has Boarding-House Reach

Narrow warehouse storage aisles are stated practical with use of a new electrical turning truck with forks that reach out to pick up or deposit load.

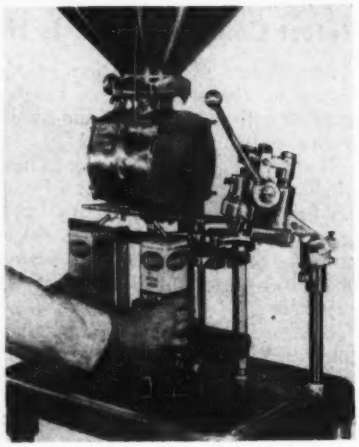
Described as the truck with "boarding-house reach," it will right-angle tier from any 6 ft. aisle due to its fork action, short length and off-set drive wheel with 200 deg. turning arc. Its forks extend 24 in. and back in a few second's time.

Unit will handle pallets of any size without necessitating changes in truck. It enables pallets to be stacked close together since no space is needed between loads to accommodate the base forks and is termed ideal for loading or unloading motor trucks and boxcars.

Lightweight of unit, having no counterweight, permits operation on low-capacity elevators and floors. Truck is designed with a 51 in. free lift, enabling loads to be elevated in low-ceiling areas, boxcars and truck trailers without increasing truck's overall height.

Unit utilizes 10 x 5 load wheels which result in less floor and wheel wear. Standard 12v. battery slides in or out on built-in rollers for fast, easy changing. Knee-action swivel casters and larger load wheels enable truck to be operated without slowdown or uneven floors, door sills and dock boards. Truck has a 2,000 lb. capacity. —*Raymond Corp., 62 Madison St., Greene, N. Y.*

Circle 148B on Reader Service Card



Paper Carton Filler For Smaller Dairy

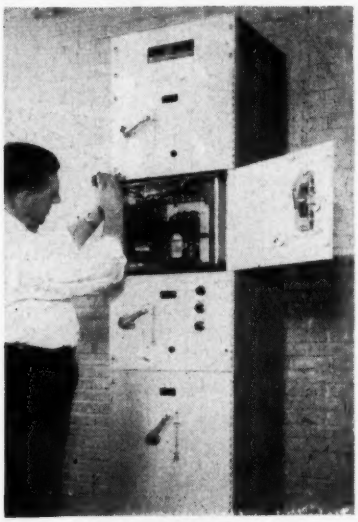
This new paper-carton milk filler is designed to meet the needs of the smaller dairy. Called the R-1, it is a semi-automatic machine and can handle all sizes of the American Can type carton.

Requiring only one operator, unit accurately fills 8 to 10 quarts a minute without waste foaming or short fills. Filling of thirds and half-pints is slightly faster. Changeover from any size carton to another is accomplished without tools and takes less than 5 min. Closure produced by machine is leak-proof. Carton itself will burst

before seal will leak, manufacturer states.

Cleaning of filler is fast and easy. There are no pockets or crevices and all parts allow free drainage of milk or water from machine. Total time for disassembly, wash up and reassembly is about 15 min. Unit has been examined and found to be in compliance with requirements of Milk Ordinance and Code as recommended by U. S. Health Service and is guaranteed to pass all local Board of Health Inspections.—*Triangle Package Machinery Co., 6637 Diversey Ave., Chicago 35.*

Circle 148C on Reader Service Card



All-Aluminum Highlights New Control Center

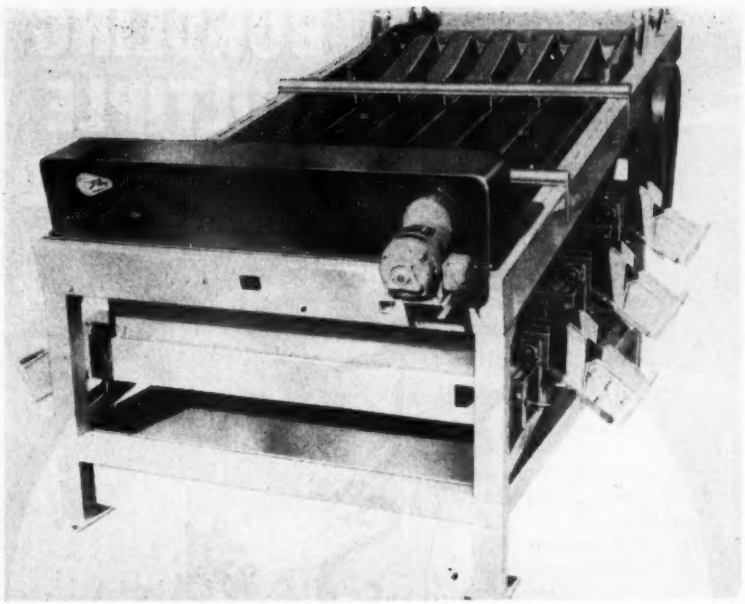
This new all-aluminum, electrical control center is aimed specifically at the food field. It is particularly suited for use in areas where humid or corrosive atmospheres are a problem.

Notable for its clean and neat appearance, the unit is reported 65 percent lighter than its steel and copper counterpart.

Design of new control incorporates desirable features of conventional units: (1) economical use of space; (2) easy installation; (3) reduction of work hazards; (4) efficient control supervision.

Individual component design simplifies maintenance. Individual units are removed easily; a 90 deg. turn on two quick fasteners is all that is necessary.—*Westinghouse Electric Corp., 401 Liberty Ave., Pittsburgh, 30, Pa.*

Circle 149A on Reader Service Card

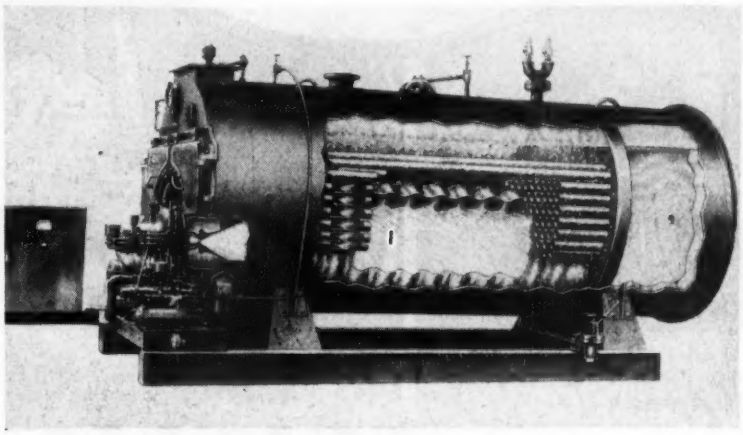


Graders Employ New Fiberglas Shaker Pans

Stability, strength and smooth, clean surfaces mark the new molded Fiberglas shaker pans now being used in these graders.

High capacity size-grading of such diversified products as shrimp, soft figs, dill pickles, carrots, sprouts is gained with graders. Units were formerly equipped with hand fitted shaker and drain pans. Rigid testing confirmed that porcelain-like surface of molded Fiberglas does not transfer, absorb or impart undesirable effects to product. New pans are reported to improve product handling while reducing maintenance and replacement costs to user.—*Dudley Machinery Corp., Mountain View, Calif.*

Circle 149B on Reader Service Card

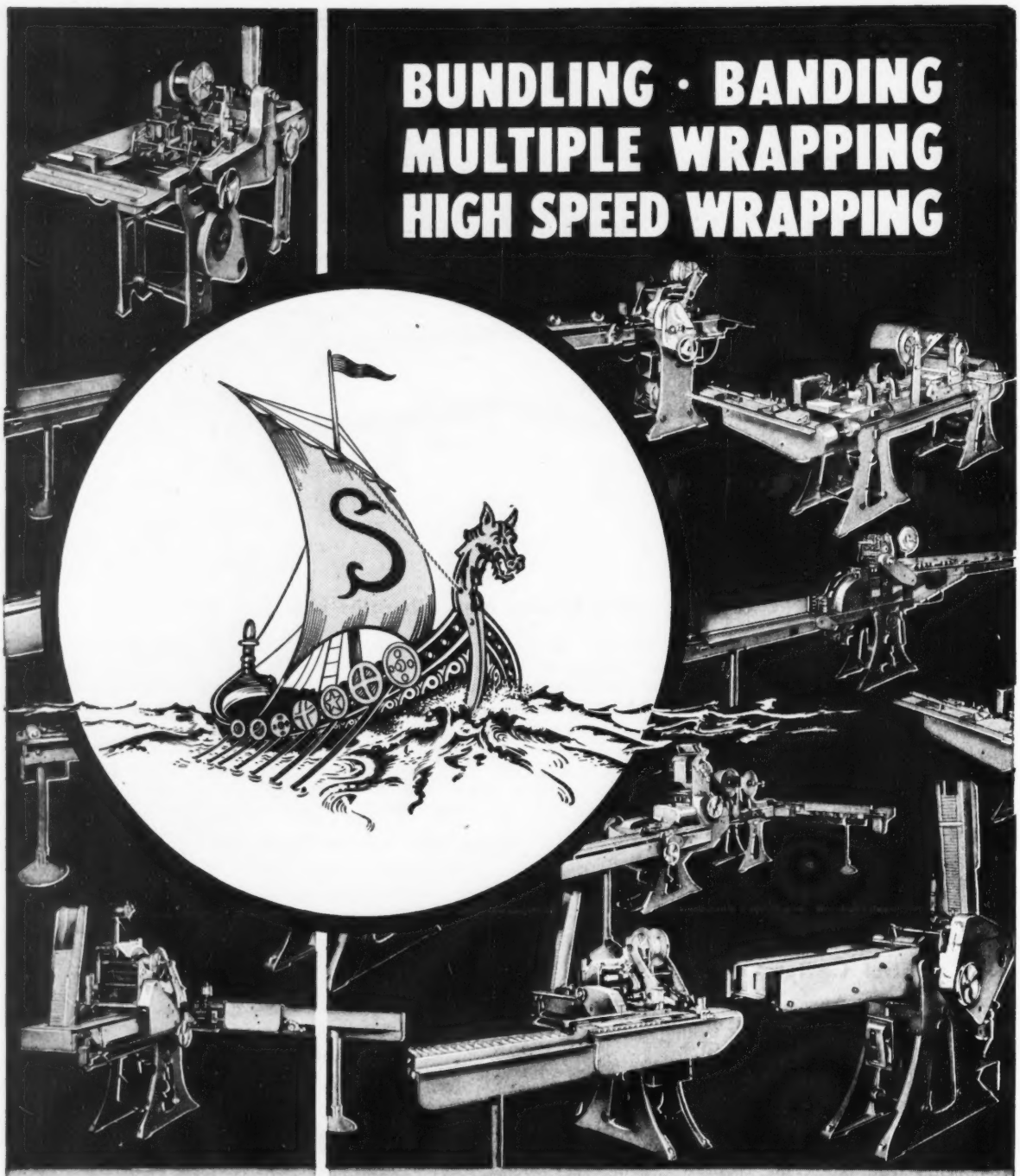


Burner and Boiler Combination

Two firms—a boiler maker and a burner manufacturer—have coordinated the engineering of their respective products so that the combination can be obtained as a unit.

Boiler-burner units include both steam and water models, ranging in sizes from 39-456 h.p. for high pressure steam and from 1,313,000 to 15,300,000 Btu. for 15 lb. steam or 30 lb. water. All models are available, equipped for firing No. 6 or lighter oil, or for high or low pressure gas, or a combination of the two. Shifting fuels is fast and easy.

While engineered as a unit, boilers



SCANDIA

Manufacturers of Better Packaging Machinery

• 500 BELLEVILLE TURNPIKE • NORTH ARLINGTON, N. J. •

• MANUFACTURED UNDER BRONANDER PATENTS •

and burners are separately manufactured by the two companies. Boilers, shipped direct to job are Scotch type, pre-tested, equipped with all necessary accessories, and mounted on steel skids. Burners include forced draft air supply and all combustion controls, mounted and pre-wired in one central control cabinet. Burner controls and accessories are completely assembled and factory tested before shipment.

Matching connections make it possible to attach burner to boiler quickly and easily. Refractories are integrally mounted at factory, cutting time and labor required in field to minimum. Forced draft burner operation eliminates need for a high stack; a small vent, extending above the roof, is only requirement. Boilers, conform to ASME boiler construction code, and are rated in accordance with code of Steel Boiler Institute. Burners are approved by Underwriters' Laboratories, Inc. Local service will be supplied on units by combined field organizations. —*Kewanee-Ross Corp., Kewanee, Ill., and Petro, Cleveland 11, Ohio.*

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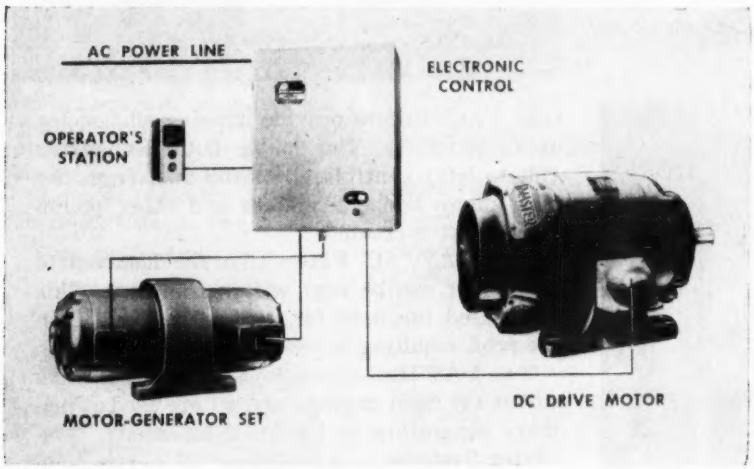


Speed Variations Controlled Electronically

Remote, stepless speed regulation is provided by electronic-controlled variable speed drives. Designated Speedrangers, they are available in two types, GV and EV. The former range in size from 2 to 10 hp, the latter ½ to 1½.

Electronic control permits speed to be made responsive to signals based on speed, load, current, voltage, pressure, light, temperature or time. Three or two phase a.c. power is converted by a motor-generator set and by tube type electronic rectifiers to supply a d.c. variable speed shunt-wound motor. Speedrangers feature smooth starting, fast-stopping, a wide range of operating speeds, constant torque over entire speed range, good speed regulation, infinite-step speed adjustment which can be set either when running or stopped.

Type GV has basic speeds of 2,400, 1,750 and 1,150 rpm. Drive speeds are adjustable down to ¼ of basic speed for continuous duty, 50 deg. C. and to 1/10 of basic speed for intermittent duty.

Control is provided by knob rotation at a small (3 x 6¼ in.) compact operator's station. A control cabinet contains the tube rectifiers, motor starter (overload protected) protective relays and other electronic elements.

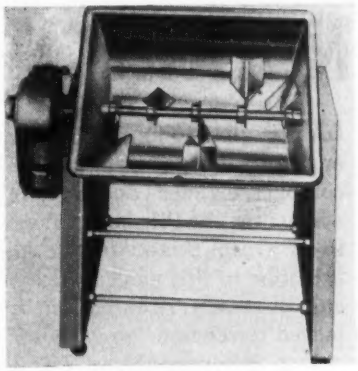
Motor-generator set and d. c. drive motor are standard, open, drip-proof, ball-bearing construction.

Motor-generator set, operator's station and control cabinet can be located together or separately providing maximum mounting flexibility in cases of space or weight limitations.

Type EV are similar to GV in operation and performance except no motor-generator set is used. Single phase a.c. power is converted to d.c. entirely by tube type electronic rectifiers. Basic speed of EV is 2,400 rpm, adjustable down to ¼ of basic speed for continuous duty and 1/20 for intermittent duty.

Optional features offered with both types are jogging, reversing, dynamic braking and special duty cycles.— *Master Electric Co., 126-30 Davis Ave., Dayton, Ohio.*

Circle 151A on Reader Service Card

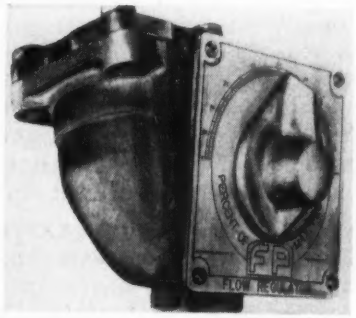


Sanitary Meat Mixer Has Tilting Bowl

Fast and thorough mixing of meats and other foods is reported with use of this new machine. Ease and speed in loading and unloading is attained through the tilting action of the large stainless steel bowl.

During mixing operation, bowl locks securely in upright position. New design series of stainless steel paddles is stated to assure rapid and thorough mixing or seasoning without crushing. Unit, powered by a ¾ hp. motor, has a capacity of 150 lb.— *The Kleen-Kut Manufacturing Co., 5501 Denison Ave., Cleveland 2.*

Circle 151B on Reader Service Card



Compact Flow Regulator Is Easily Maintained

Dependable control is provided by this new, automatic flow regulator. Unit is compact, simple in design.

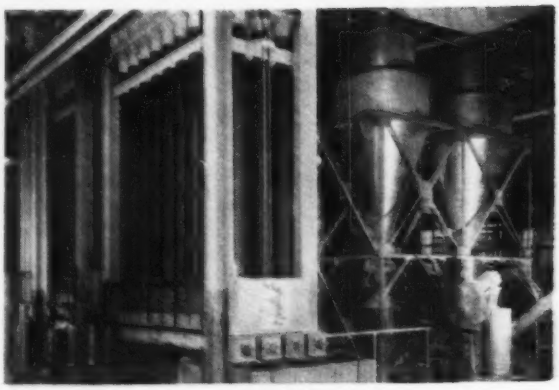
Easily maintained, the unit can be screwed directly into a pipeline. It maintains a pre-set flow rate despite changes in stream pressure. Requiring no outside source of energy, it is operated entirely by liquid passing through.

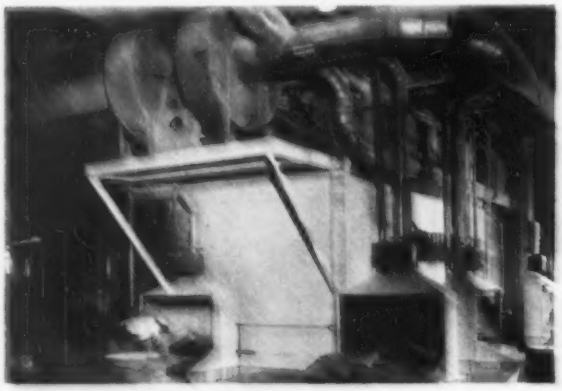
Regulator is adaptable to in-line or to panel mounting (dial and capacity regulating knob in front, with rear mounting of controller body). Spring loaded, it can be mounted in any atti-

HOW PILLSBURY CONTROLS DUST IN CAKE MIX PLANT . . .

DAY engineers in collaboration with Pillsbury engineers designed, engineered and installed the compact, efficient and economical dust control systems in the Pillsbury cake mix plant at Hamilton, Ohio. Space and head-room were at a premium in this modern, one story plant and as can be seen in the photos the equipment was placed to consume a minimum amount of space.

Two unhoused DAY "AC" (reverse jet, automatic-continuous) Dust Filters (photo right) clean and return to the work space the air from one double DAY Exhauster.



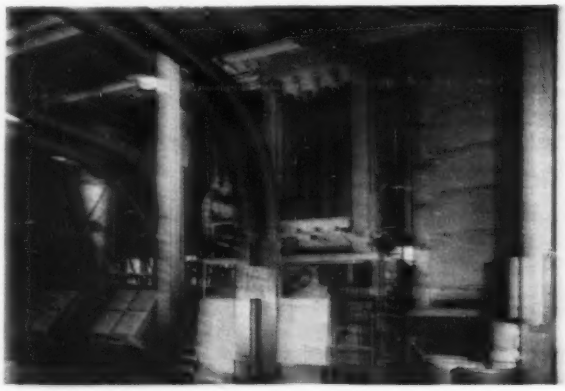


DAY "AC" Filters provide filtering efficiencies up to 99.99+%. The double DAY Exhauster (photo left) controls all of the dust from the bins, dump hoppers, mixers and other points where dust is created.

With DAY "AC" Filters all of the dust control equipment can be kept within the plant. This eliminated the need for placing equipment on the roof, resulting in a neater looking building.

Two DAY Dual-Clone Separators with rotary valves (at right in photo above) are used as primary separators on the DAY Pneumatic Conveying Systems.

A *housed* DAY "AC" Filter (photo at right) is the secondary separator for the pneumatic conveying systems. DAY Pneumatic Conveying Systems provide a self cleaning and flexible method for handling bulk materials. They can be installed where mechanical conveyors won't fit.



72 YEARS OF EXPERIENCE

Profit from our long experience handling dust problems for the food industry. The nation's leading millers and food processors depend upon DAY for dust control engineering, equipment and service. A national survey shows DAY the predominant choice by a margin of 10 to 1.

Let DAY solve your dust problem. Our service includes: studying the source of dust, engineering a practical solution, fabricating and installing the complete systems.

DAY SINCE 1881
DUST CONTROL
A SINGLE UNIT OR A COMPLETE SYSTEM

Bulletin No. 528 contains new information on dust control . . . Write for your copy today.

The DAY Company

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Branch Plants in Buffalo, Ft. Worth and Welland, Ont.

tude. Direct manual, and remote pneumatic setting arrangements are freely interchangeable.

The ½, 1 and 2 in. sizes in which unit is readily available can handle flow ranges of 0.5 to 5, 1.0 to 15, and 6 to 80 gpm., respectively. A true percentage-type scale is furnished as well as a specific gravity correction factor tag when liquids other than water are being metered.

Reproductability of flow rates with a given dial setting will be at least as good as plus or minus 3 percent over a pressure-drop range of 5 to 125 psi.

New controller, maintains constant flow rate by maintaining constant pressure differential. Unit is designed to operate at a pressure loss across valve of 5 psi. But it can be adapted to low-pressure-drop service simply by removing one of its two springs. Standard size models with screw-thread provisions for mounting are readily available in either bronze or stainless steel. —*Fischer & Porter Co. 17, Jacksonville Road, Hatboro, Pa.*

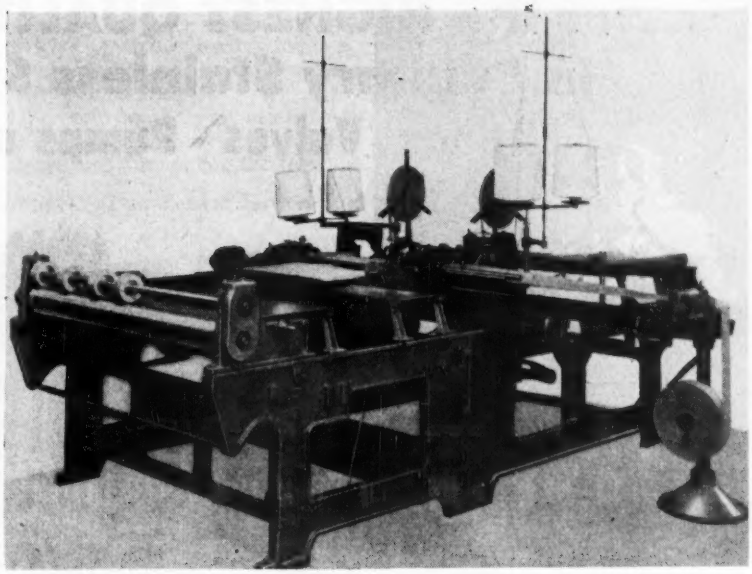
Circle 151C on Reader Service Card

Lightweight Mask-Filter For Non-Toxic Work

Protection against light dusts, chips and particles is provided by this featherweight plastic mask and cotton gauze filter. Complete unit protects nose, lungs, face and eyes in all types of light, non-toxic work.

Filter pad consists of cotton and sanitary gauze treated for softness and is replaceable.—*General Scientific Equipment Co., 2700 W. Huntingdon St., Philadelphia 32.*

Circle 153A on Reader Service Card



Sews Multi-Wall Bags at One or Both Ends

This new machine sews one or both ends of a multi-wall bag, and produces a sift-proof seal by applying selvage tape over the sewing.

With tape-over type of sewing, ends of tube are sewn first, then selvage is glued and applied over stitches, forming a sift-proof seal for multi-wall bags used for sugar, flour, starch, and numerous other pulverized or finely ground materials.

In use for several months, new Model S-3 sews bags ranging in size from 10x20 in. to 26x54 in. at a rate of 30-40 bags per min. Machine occupies a floor space of 4x9 ft. and is 36 in high.—*Potdevin Machine Co., 285 North St., Teterboro, N. J.*

Circle 153B on Reader Service Card

Overall Length Minimized On Powered Hand Trucks

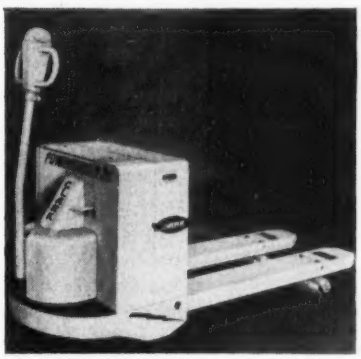
Compactness marks the new "Powerworker 26" line of powered hand trucks. Minimum overall length has been accomplished by reducing the "lost length" to 26 in., truck being only 26 in. longer than the load being carried.

Line includes low lift pallet and platform trucks in both 4,000 and 6,000 lb. capacities; telescopic tilting fork trucks in base capacities of 1,500, 2,000, 2,500 and 3,000 lb., all at 24 in. center line or 48 in. load length; as well as walk-it-or-ride tractors designed for either slow or high speeds. All of trucks in line can be ridden by operator.

Design features incorporated in new models provide maneuverability, high load stability, operator convenience and simple and quick maintenance.

A low center of gravity for load stability has been obtained by placing battery in an underslung position. Load stability is also furthered by use of a 6-in. wide, 10½ in. dia. drive wheel.

Feature incorporated for improved



operational safety is the brake, which operates on motor shaft, transmits its action through a gear reduction of 22 to 1. Further, brake is spring applied and actuates a "deadman" switch that automatically throws out power circuit when steering handle is in vertical or horizontal position. To avoid an obstruction hazard, steering handle automatically returns to vertical position when released.

Control box and tubular bayonet type handle are a welded assembly mounted on steering handle, and provide two speeds forward and reverse through defined notched positions.

...for the HIGHEST QUALITY in Sanitary Stainless Steel Fittings . Valves . Pumps and Tubing...

Try TRI-CLOVER

Compare these fitting features...

- FABRICATED FROM TOP QUALITY STAINLESS STEEL
- FULL CORROSION RESISTANCE
- ALL FITTINGS MEET OR *EXCEED* 3A STANDARDS
- SWEEP CONSTRUCTION — FULL FLOW — NO CREVICES
- CLEAN — SQUARE CUT ACME THREADS
- ACCURATE, SMOOTH FINISH BEVEL SEATS
- TRUE O.D. DIMENSIONS — POSITIVE ALIGNMENT

For "C-I-P" LINES

Tri-Clover offers the complete "TRI-CLAMP" line of fittings and valves, for cleaned-in-place installations. These fittings, in sizes from 1½" through 4" O.D., are simple, fast and economical to install, and are thoroughly proved in service.

To convert existing Acme thread fittings to C-I-P service, a simple, positive Super Speed Conversion Tool is available.

See your nearest TRI-CLOVER DISTRIBUTOR

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These features are representative of the extra measure of quality you get when you standardize on TRI-CLOVER Stainless Steel Fittings, in sizes from 1" through 4", for your sanitary lines. These same high standards of quality and performance apply equally well to the complete line of valves, pumps, tubing and specialties which Tri-Clover has furnished to the food, dairy, beverage and brewing industries for over thirty years.

For *one* quality source of supply for *all* your sanitary line requirements, be sure to specify TRI-CLOVER.

Tri-Clover® MACHINE CO.
Kenosha, Wisconsin

TRIALLOY AND STAINLESS STEEL SANITARY FITTINGS, VALVES, PUMPS, TUBING, SPECIALTIES

FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS

THE Complete LINE

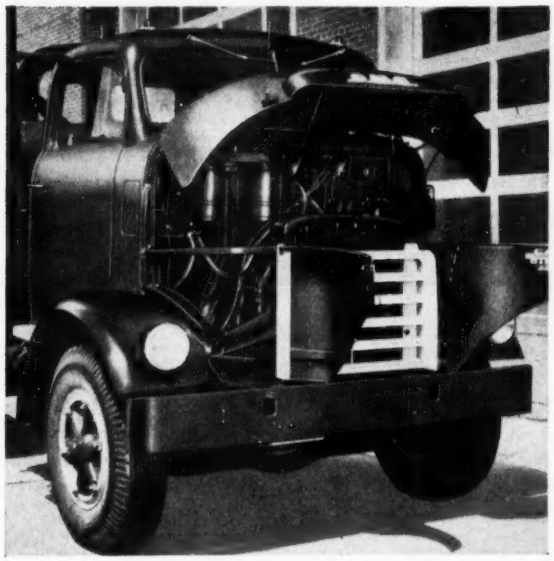
S154

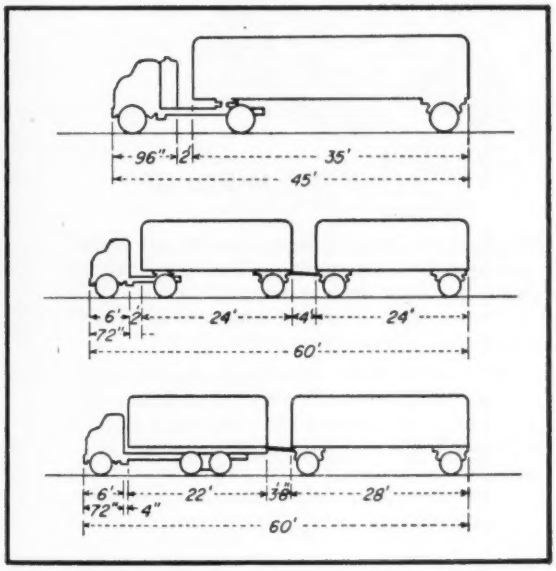
Speed and direction are selected by a spring loaded finger-tip walking beam or butterfly valve built into box. It is not possible to direct forward and reverse current simultaneously to drive motor.

To provide steering ease regardless of load or operating conditions, drive unit is supported in truck frame by an arrangement of wide-spaced thrust and radial roller bearings.

For easy service and maintenance, all operating units are readily accessible without dismantling the truck. A standard, 10½ x 6 x 5 in. I. D. readily demountable tire is used for drive wheel. All maintenance work can be done with simple mechanic's tools, eliminating need for hydraulic press fits.—*Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.*

Circle 153C on Reader Service Card





Shortened Cab-Over-Engine Tractors Permit Maximum Loads

Maximum load opportunities under various state overall length laws are offered by a new series of shortend cab-over-engine highway tractors.

New COE design covers states with 45 ft. length laws and those having 60 ft. length limits. Bumper-to-back-of-cab length on new heavy-duty units now is 72 in., a reduction of 10 in. on present models. This design was achieved by using a flush radiator grille and squaring off back of cab without compromising interior cab space or driver comfort.

Heavy-duty units thus affected are models F630-42, DF660-47, and F660-50, all being four-wheelers, and the following six-wheelers which are new models in the line: FW620-42 and DFW620-47.

In the 20 states with 45 ft. overall length laws the 35 ft. trailer is the longest practical under the existing laws. While a 72 in. bumper-to-back-of-cab dimension is not required in order to pull a 35 ft. trailer in a 45 ft. state, it does become a requirement when a 24 in. sleeper compartment is added to the back of cab, resulting in a 96 in. BBC dimension. This 96 in. dimension is maximum length that permits use of 35 ft. trailers within the 45 ft. length states. It leaves a 2 ft. clearance between sleeper compartment and trailer, giving operator enough turning radius for any type of trailer he wishes to use, including square nose design.

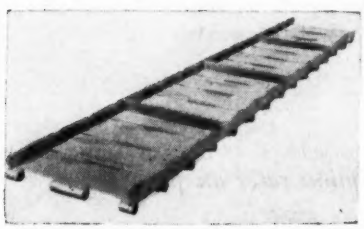
In all western states with 60 ft. overall length limits, trailer combinations of two 24 ft. semi-trailers give 48 ft. of trailer space, while a truck body of 22 ft. and a full trailer of 28 ft. length permits load space of 50 ft.

Using new COE unit, the 60 ft. length then would be composed of cab, 6 ft.; space between cab and semi-trailer, 2 ft.; semi-trailer, 24 ft.; draw-bar, 4 ft.; and trailer, 24 ft.

When using a 22 ft. body on a tandem-axle truck, the 72 in. BBC is required also to permit pulling a 28 ft. trailer with a 4 ft. draw-bar.

To minimize service problems on heavy duty COE's, hinged doors have been placed on either side of grille, and engine accessory locations have been changed to facilitate quicker servicings.—*Truck & Coach Div., General Motors Corp., Pontiac, Mich.*

Circle 155A on Reader Service Card



Hinged-Apron Conveyors Handle Numerous Items

This new line of piano-hinged apron conveyors in three pan types, four chain pitches and four basic assemblies is designed to meet a wide variety of carrier applications.

Pans are interlocked at articulation point to provide a minimum of opening and a smooth joint, and to prevent material from seeping through. Tightness of hinges reduces tendency to wedge or pinch materials being conveyed.

Because of their tight construction and sanitary characteristics, they can be used effectively for cereals and

Waldin Smugg IS ALL MIXED UP

Waldin Smugg makes a product we'll call foodle. He says foodle is a separate "industry." Reads nothing but foodle articles because foodle is not like any other food. Isolated behind this brick wall of complacency, Waldin Smugg proceeds to his doom.

Why? Because down the street Smugg's competitor, Foodle Inc., has just read in FOOD ENGINEERING how another *kind* of food plant – say, a chowdy processor – has found a new way to mix continuously. Now, *of course,* foodle and chowdy are two different foods – *but* they can be mixed the same way. So Foodle Inc. tries the chowdy mixer. *Up* goes quality, *down* goes cost.

And – if his competitors pull this stunt often enough – down, too, goes Waldin Smugg.

Walled in by his narrow viewpoint, Smugg can't see the tidal wave of *engineering* that is carrying new ideas, equipment, and materials from one kind of food plant to another . . . But FOOD ENGINEERING's editors see it – and report it.

They reach into *every kind* of food plant for new cost-cutting, quality-boosting ideas for *all.* They help each kind of food plant use the experience of the others. *(See graph at right.)*

And FOOD ENGINEERING looks *outside* the food industry for applicable ideas in labor relations, maintenance, electronics, materials handling, and countless other industrial subjects. For FE uses the unmatched facilities of McGraw-Hill, industry's "Headquarters for Business Information."

We think we can *help* Waldin Smugg. If you see him, tell him. If you see him in your mirror . . . look over *your* wall with FOOD ENGINEERING.

THE TIDAL WAVE AND YOU:
DIFFERENT FOODS ARE MIXED SAME WAY

FOOD PRODUCTS may differ, but problems in processing them are often alike. So are the solutions. For example, if you are not keeping abreast of the advance of continuous mixing – *wherever* it is being used on food – you may be missing important cost-cutting, quality-building ideas.

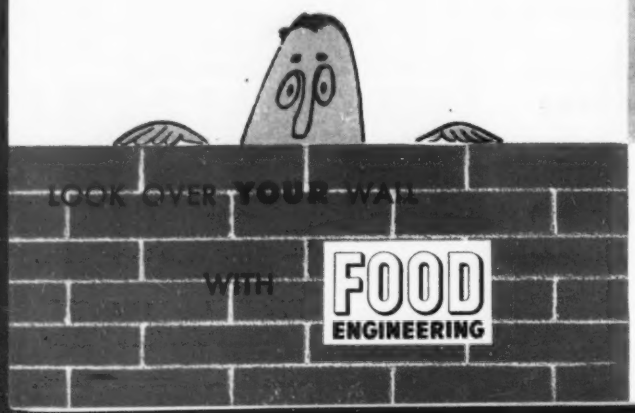
This graph shows how rapidly continuous mixing has moved from one type of food plant to another – particularly in the past few years. And, in almost every case, each new continuous mixer can be used on many "different" foods.

For instance, one continuous mixer (rotating-head, fixed-stator type) can be used on marshmallow, cake batter, egg whites for drying, whipped butter, mayonnaise, nougat, and icings. That's at least 5 different kinds of food plant!

Another – a colloid-mill type – is used for meats for baby foods, cream cheese, fish pastes, essential oils, flavorings, cake mixes, pie fillings, cocoa, and chocolate syrup. At least 8 different kinds of plant!

Still another continuous mixer is used by producers of lard, candy bars, margarine, cooking oils, and shortening.

Yes, in mixing – as in most other food-plant operations – products may differ, but processes are the same. That's why, as in the past, the readers of FOOD ENGINEERING will be first to learn of new continuous mixing equipment – *wherever* it originates. For FE reports on *all* food processes – helping each kind of food plant use the experience of the others . . . to cut ever-rising costs, to improve quality.



Subscription rates on page 3

other food products. Also, under certain conditions, they are well adapted to handling many types of coarse and granular materials.

Conveyors carry materials horizontally, up and down inclines as steep as 45 deg., and in combination of these paths.

Pans are available in widths from 12 to 48 in. They can be made in steel, stainless steel, aluminum or other materials.

Using flat or semi-flat pans, they are suitable for horizontal or slightly inclined runs. Pusher bars permit operation on steeper inclines. Deep bucket-type pans are used for steepest inclines and for handling large capacities. Formed hinges are used on the smaller sizes, welded tubular hinges on those having greater capacities.

Apron line can be driven four ways:

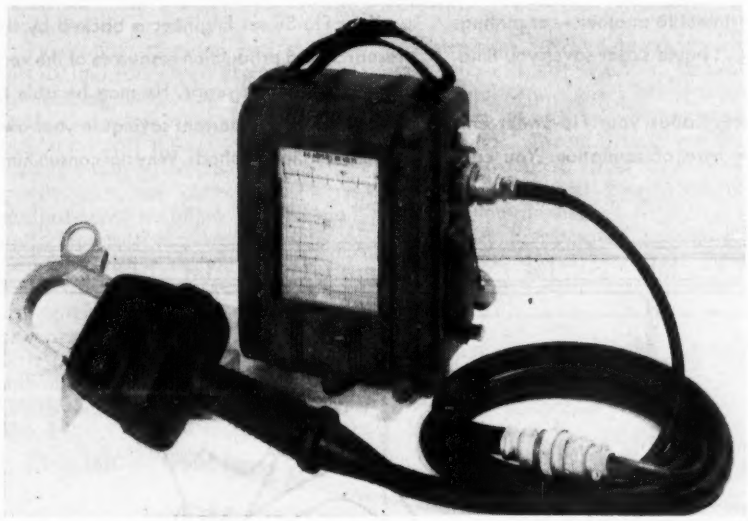
1. Full chain and rollers on both sides, for long runs, steep inclines and particularly heavy loads.

2. Half chain and rollers on both sides, with sides of pans used as inside links of chain.

3. No chain, but with outboard rollers to support pans on rails. Sprockets engage hinged section of conveyor.

4. No chains and no rollers, for short conveyors with relatively small pull.—*Link-Belt Co.*, 307 *N. Michigan Ave., Chicago* 1.

Circle 155B on Reader Service Card



Portable Unit Simplifies Checking Electrical Apparatus

Ease and accuracy in checking various electrical apparatus is provided with use of this new portable recording instrument.

Equipment is expected to be particularly useful for checking loads on distribution lines, verifying motor loads, and in detecting overloaded circuits, transformers, motors.

Equipment consists of a hook-on current transformer, a connecting lead, and an inkless recording volt-ammeter. All three components are completely interchangeable with no sacrifice in accuracy.

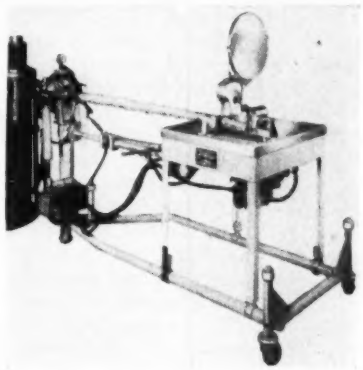
According to maker's engineers, alternating current can be measured and recorded on both insulated and non-insulated conductors in circuits operating at potentials up to 8,700v. This is accomplished by hooking current transformer around the lines and connecting recorder to a 120/240v. a.c. source. Procedure obviates necessity for production-line work interruption while load surveys are made.

Featuring a self-supporting hook suitable for all conductors up to 2 in. dia., transformer provides current ranges from 15-750 amp, selected by a range-changing switch on side of instrument.

Over-all accuracy of instrument is 3 percent of full scale value, except on measurements above 625 amp. On the 750 amp. range it is 4 percent. Recorder used as a rectifier-type voltmeter has accuracy of 3 percent of full scale on all voltage ranges. Accuracies are based upon sinusoidal currents at 50-60 cycles and normal ambient temperature of 25 C.

Equipment weighs 18¾ lb.—*General Electric Co., Schenectady* 5, *N. Y.*

Circle 157A on Reader Service Card



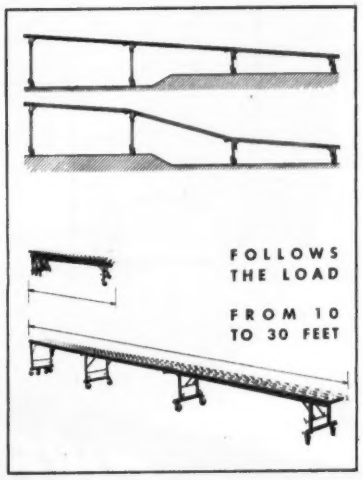
New Machine Saves Labor and Materials

Savings in both materials and labor, and improved product appearance, are reported with use of a new machine called the Exact-O-Fill.

New unit measures, fills and seals sausage and other semi-viscous products in synthetic casings.

Unit is a semi-automatic machine which fills exact weights of product into continuous lengths of casing, seals off each length with a new aluminum clip and cuts the link free—all with one operator. It measures from 6 to 20 oz. in one link. Machine is easy to clean.—*Globe Co., 4000 S. Princeton Ave, Chicago.*

Circle 157B on Reader Service Card



Telescopic Mover Takes Load on Stepped Levels

Time and labor are saved on short hauls with use of this new and improved telescopic conveyer.

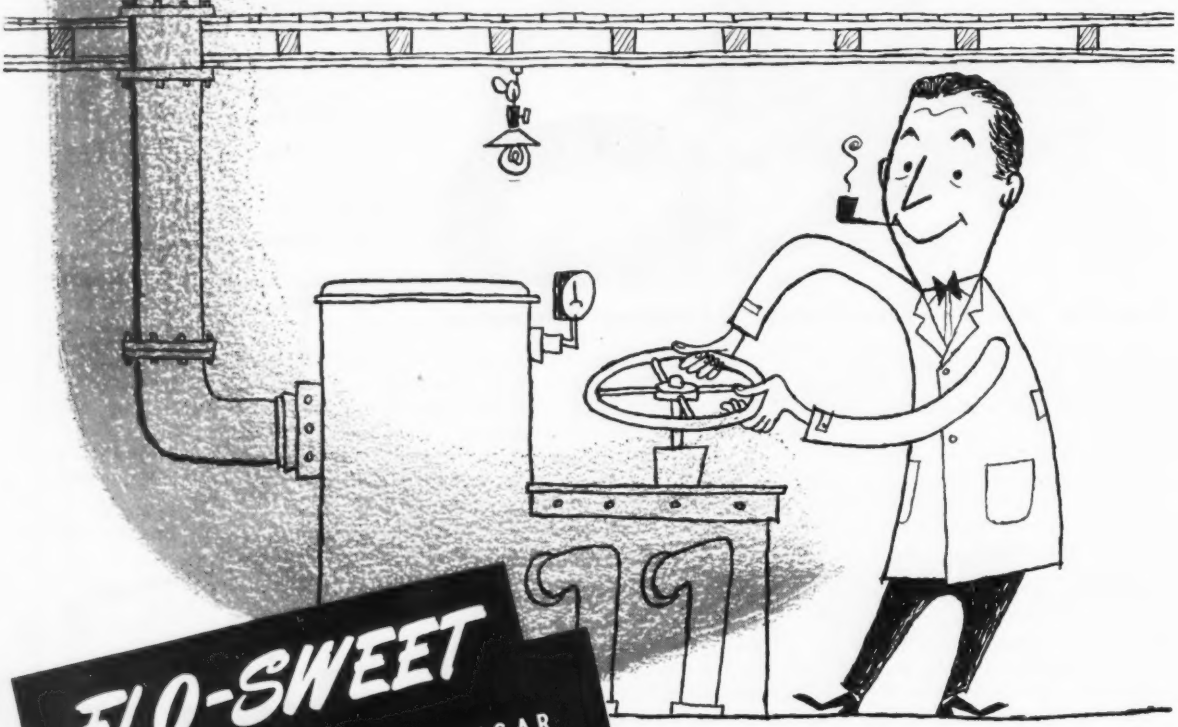
Joining each other only at one universal-type roller-bearing point, the 10 ft telescoping sections may be

How to get your sugar upstairs in a hurry...

"With a liquid sugar system there's never any delay in getting your sugar right where you want it," reminds your Flo-Sweet Engineer. "Whether you're receiving sugar into your plant — transferring it from one department to another — or putting it into process . . . liquid sugar saves you time and labor.

"What's more," adds your Flo-Sweet Engineer, "you're sure of sanitation. You can heat or cool the sugar just the right amount for best results with the processes you're using. And with Flo-Sweet, you get a quality-controlled sugar carefully blended to your particular needs. Why settle for less?"

Your Flo-Sweet Engineer is backed by the research and production resources of the very pioneers in liquid sugar. He may be able to help you make important savings in your own sugar handling methods. Why not consult him?



FLO-SWEET

FIRST IN LIQUID SUGAR

Distributed from Yonkers • Pittsburgh • Toledo • Detroit

REFINED SYRUPS & SUGARS, Inc.

YONKERS, NEW YORK

SERVING INDUSTRIAL SUGAR USERS EXCLUSIVELY

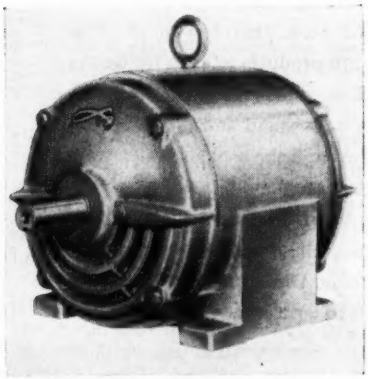
placed on irregular or stepped surfaces without binding and without jostling conveyed materials or packages between sections. A self-adjusting transfer bar between sections eases the ride of even small packages along the conveyor. It can be extended with light hand pressure to any length from 10 to 40 ft.

Important improvement is its easy fitting into vehicles which do not meet level of shipping dock. Flexibility of new joint permits conveyor to be placed on uneven or stepped surfaces. A single, simple height adjustment of supports to maximum expected difference in levels will suffice for every loading or unloading, including extension or collapse of sections as stacking point advances. All casters on sections are in constant firm contact with ground.

Telescoping at either end and adjusting immediately to expanding and diminishing loads, on one or more levels, the conveyor requires no height regulation as it follows loading or unloading point. Once adjusted for best gravity pitch, new conveyor needs no readjustments to follow stacking and unstacking pattern in storerooms, platforms, or within cars or trucks.

Two types of load-bearing surface are provided: roller type, for heavy or unpredictably-shaped goods, and skate-wheel type, for moving cartons and other readily-stacked packages.—*Wilkie Co., 5520 Arch St., Philadelphia 39.*

Circle 157C on Reader Service Card



Power Up, Size Down In New Motor Line

More power in a smaller package keynotes a new line of electric motors in open drip-proof, totally-enclosed fan-cooled and explosion-proof types in ratings up to and including 40 hp. at 3,600 rpm.

Units are built in accordance with new NEMA frame size standards and are presently available.

Added notable features are: Modern styling; improved ventilation; greater protection; a new conduit box arrangement; new bearing construction, and more versatile mounting.

Styling emphasizes clean-looking and well-proportioned motors without sacrificing functionalism to appearance. Savings in weight have been effected through reduction in size and bulk of cast iron housing and motor bearing brackets at same time retaining mechanical strength.

Bearings and shafts have been selected for long life and better overload capacities for V-belt drives. In motors of all sizes, special effort has been made to use bearings easily obtainable from local stock, assuring customer of prompt replacement.

Bearings are factory lubricated with ample grease storage reservoir. In normal usage they will give years of satisfactory service without maintenance or attention. Grease fittings can be supplied, if desired. Seals have been improved to prevent grease leaking out along motor shaft.

Back-end bearings are locked in place by a cap. Locknuts on motor shafts minimize possible end play.

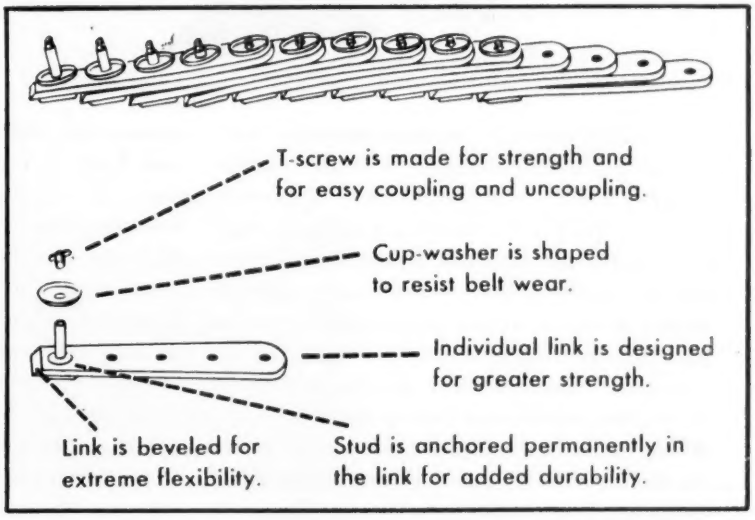
New motors in open, drip-proof construction now have "single and ventilation." Cooling air enters at one end, passes through motor, exits at opposite end. This eliminates ventilation opening in housing and provides a well-enclosed motor suitable for any mounting position.

Conduit box arrangement is new. Both open and enclosed motors have a new-type split-condit box that separates into halves for easy electrical connection. A spacer inside box provides permanent and positive identification of various leads.

A new, alternate conduit arrangement for the open, drip-proof motor permits omission of box entirely where motor must be used in crowded quarters.

Open motors are considerably more drip-proof than previous units and are also much better protected. Stator housing in both enclosures are long enough to protect coil ends from damage during manufacture and when motor is disassembled for inspection or maintenance. — *Louis Allis Co., Milwaukee 7.*

Circle 159A on Reader Service Card


T-screw is made for strength and for easy coupling and uncoupling.
Cup-washer is shaped to resist belt wear.
Individual link is designed for greater strength.
Link is beveled for extreme flexibility.
Stud is anchored permanently in the link for added durability.

Adjustable V-Belts Are Easy to Couple and Uncouple

Simplicity of coupling and uncoupling mark new adjustable v-belts for D and E drives.

Known as TD and TE, belts are made of plys of treated high-tensile strength canvas duck, joined by riveted studs with removable cup-washers and T-screws. Construction gives strength and durability at all key points yet enables belts to be coupled and uncoupled easily.

Belts are said to provide maximum flexibility to last longer, run cooler and smoother. Two types are available: regular rubber coated for general service and oil-proof for oily and high temperature drives.—*Manheim Mfg. & Belting Co., Manheim, Pa.*

Circle 159B on Reader Service Card

Mister, you're surrounded by things containing diatomite, or which were filtered by it. That beer you're delivering owes its brilliance and clarity to diatomite filtration. The paint on your truck has likely been extended with diatomite. Your battery may have diatomite as a filler in the case or separators. And diatomite helped in several ways to produce the oil which lubricates your truck motor.

In any of these cases, mister, it's a better-than-even bet that the diatomite used bore the name DICALITE — because DICALITE is top-quality diatomite, processed for many uses to the highest quality standards ever established. Food processors use DICALITE filteraids to produce sugar, shortening, salad oils, jellies and other good things on the shelves of that market. DICALITE plays a vital role in producing streptomycin and other antibiotics, vitamins and other pharmaceuticals. The dry-cleaner uses DICALITE products to keep his cleaning solvent clear and active . . . there's DICALITE in the magazine pages on the news stand and in those beer cartons — and perhaps even in the asphalt under your feet and in the concrete of the building.

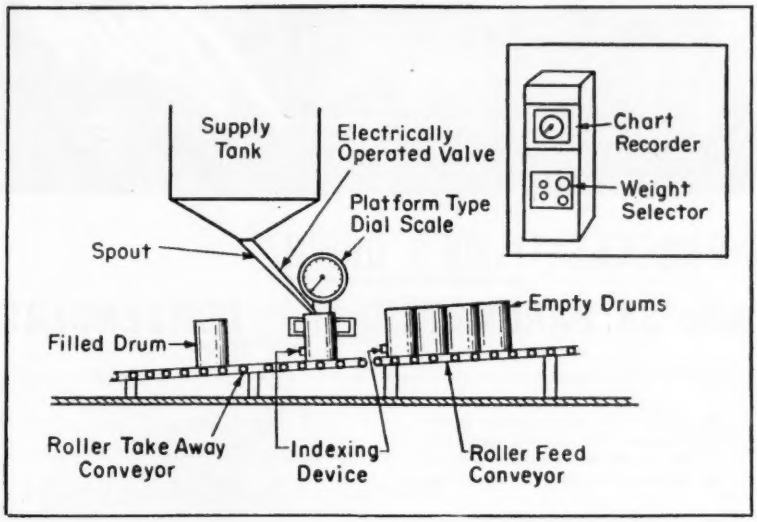
So varied are the uses of this versatile material, nobody yet knows them all. If you'd like to learn more, let us send you a bulletin on DICALITE filteraids, fillers, insulation, or other aids to industry.

Write to Dicalite Division, Great Lakes Carbon Corporation, 614 So. Flower St., Los Angeles 17, California

Dependable GREAT LAKES **Dicalite®** DIATOMACEOUS MATERIALS

NEW YORK 17 • CHICAGO 1 • LOS ANGELES 17

For more information, use coupon on page 179.



System Incorporates Automatic Tare-Weighing

Finer process control in weighing and filling operations is provided with use of a new system which incorporates automatic-tare-weighing. Based upon an advanced type of instrumentation, system minimizes overages and underages.

In operation, a drum, can, cylinder or box is automatically tared and then filled with product until a selected weight is reached. Precise weight of product in container is then recorded or printed for permanent record.

Containers may be fed to weighing platform manually or by an automatic indexing system. Automatic controls govern all phases of weighing process. Taring is accomplished instantaneously by instruments fitted to scale. System is fast, consistent, and eliminates human error.

Error in the scale accuracy is less than 0.1 percent. Product is weighed in shipping container and not in a weigh hopper, where liquids in particular could cling to walls. In effect, container here serves as a weigh hopper.

Over-under control may be applied, if required. With this control, process would automatically shut down when an average or underage occurred. In any event, a permanent record of weighings is given to customer to assure him that he is getting no underage.

Key items in taring process are precise transducers. Used to cancel the unbalance in an electrical circuit created by weight of empty containers, these transducers consist of a military-type synchro-mechanism adapted for commercial use.

System is comprised of following pieces of equipment: Weighing platform, scale dial, console instrument panel, and transducer mechanism that is mounted on scale dial.

Printer or recorder may be located on console, at weighing installation or any place else in plant. Console would also contain control buttons, relay switches and signal lights. System has an automatic alarm system that shuts down operation in whole or in part when anything goes wrong.—*Richardson Scale Co., Van Houten Ave., Clifton, N. J.*

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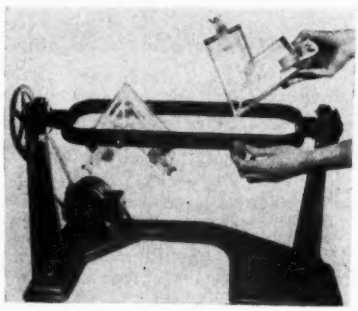

Clear, Twin-Shell Blender For Laboratory Studies

This pint size twin-shell blender has been developed to meet the demand for a small scale laboratory model. New model accommodates two small blenders in a yoke which can be interchangeably mounted in the standard 4 and 8 qt. frame.

Blender shells are made of heavy, transparent Lucite in load capacities of 1, 2 and 4 pt. with dust and water tight, quick-opening cover plates for easy cleaning. They can be quickly removed from yoke by loosening a thumb screw. Blending action is so gentle that highly abrasive materials will not mar surface.—*Patterson-Kelley Co., Inc., 371 Warren St., East Stroudsburg, Pa.*

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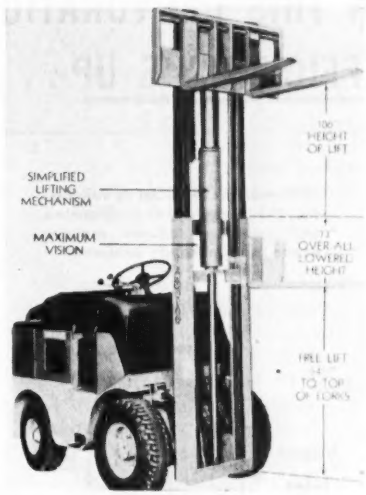

Mast-Cylinder Assembly Ups Truck's Free Lift

Unusually high free lift before increasing the overall lowered height of the truck is provided with this mast and lifting cylinder assembly.

Originally developed for installation on larger capacity units, it is now available also on all three capacities of maker's Model LT-35 trucks. Assembly expedites high stacking of heavy loads in low headroom areas and is interchangeable with standard masts. Mast can be furnished at extra cost as original equipment on any LT-35 unit. Lifts available range up to 160 in. with 81¾ in. free lift.

On Model 480-P, illustrated above, mast with 106 in. lift provides 54½ in. free lift before increasing overall lowered height of 73 in.—*Towmotor Corp., 1226 E. 152nd St., Cleveland.*

Circle 161C on Reader Service Card

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard—page 179. Then sign at the bottom and mail.

For your convenience, too, items in this department are listed and keyed in the Reader Service Section.

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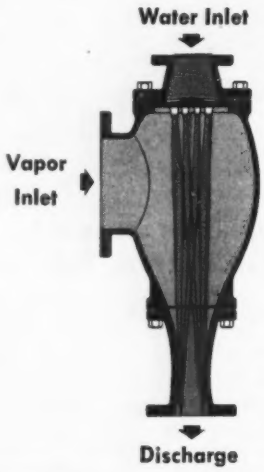
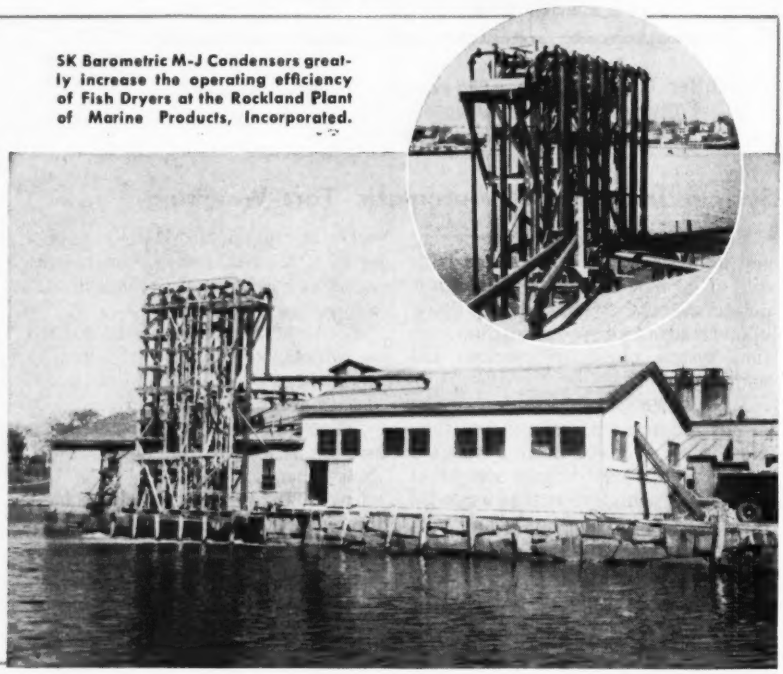
IN THIS DEHYDRATION PROCESS—TIME'S DOWN, EFFICIENCY'S UP . . . with SK BAROMETRIC M-J* CONDENSERS

SK Barometric Multi-Jet Condenser, Fig. 591. Simplicity of construction and operation reduces maintenance to an absolute minimum.



SK Barometric M-J Condensers greatly increase the operating efficiency of Fish Dryers at the Rockland Plant of Marine Products, Incorporated.



Fourteen SK Barometric M-J Condensers increase the efficiency and cut the time required to dehydrate fish at the Portland and Rockland Plants of Marine Products, Incorporated. Raw fish are dehydrated into fish meal for use in poultry feeds and dog food. Fish meal is rich in proteins, vitamins and minerals.

SK Barometric M-J Condensers have replaced mechanical pumps formerly used by the company for this purpose. Besides being less expensive to operate and maintain, SK Condensers are able to maintain higher and more uniform vacuum.

Each SK unit condenses about *7000 lbs.* of water vapor from dehydrating evaporators over a four-hour cycle and maintains a steady vacuum of 26" to 28" Hg.

Two of the principal advantages of the Barometric Condenser arrangement lie in the discharge by gravity of the injection water through the tail pipe and the handling of non-condensables without necessitating a removal pump.

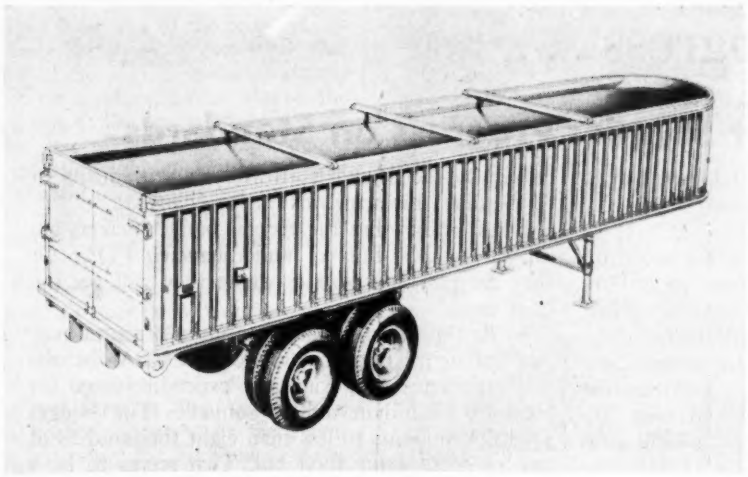
In operation, condensing water is delivered into the nozzle case and passes through the nozzles which are accurately designed to handle a specified quantity of water at a desired pressure and vacuum. The water jets are directed into the tail throat where they unite to form a single jet. Air and vapors, entering the condenser chamber through the side inlet, come in contact with the converging water jets and are entrained by the jet action and discharged with the condensed steam to atmosphere.

These particular condensers are made of cast iron and are equipped with monel nozzles and tail pieces.

For complete information on all types of SK Multi-Jet Condensers, request Bulletin 5AA.

*Multi-Jet Type

SCHUTTE and KOERTING Company
Manufacturing Engineers
[illegible] STATE RD., CORNWELLS HEIGHTS, BUCKS COUNTY, PA.
REPRESENTATIVES IN PRINCIPAL CITIES



Bulk Trailers For Citrus Fruits

Efficient hauling of bulk citrus fruit, particularly in the Florida area, is reported with employment of this new trailer.

New design is basically same type which maker has found highly successful in grain hauling operations. It can be secured in any standard length, 34 ft. being most popular. Usual body height supplied is 52 in., although this is available anywhere from 47-56 in.

Optional linings and floors are provided for unit which may be either mounted on gravity-tandem or Nuway tandem suspensions. Rear gate is also located and dimensioned to customer specifications. Trailers are immediately available in 33, 34, and 35 ft. lengths at Jacksonville, and Orlando, Fla., agencies of —*Fruehauf Trailer Co., 10940 Harper Ave., Detroit 32, Mich.*

Circle 163A on Reader Service Card

New Chemicals

Chemical Packages Cut Storage Space Needs

Where supply space is limited, use of new Dual-Pak'd products instead of conventional plywood containers will effect a saving of 40 percent in required storage room.

Photo shows outside container of new package. Each case holds three Dual-Paks. Each Dual-Pak consists of a waterproof, plastic bag inside a sturdy, three-color, corrugated carton. Plastic bag keeps product "factory fresh" and may be repeatedly opened and tightly closed until the 20 or 25 lb. of santitizing product it contains is completely used. Dual-Paks are now available and contain Neosuds, Salute, F-100 and Steri-Chlor.—*Wyandotte Chemicals Corp., Wyandotte, Mich.*

Circle 163B on Reader Service Card

Improved Resin Cement Resists Acids, Alkalies

Complete resistance to alkalies, acids, solvents and salts at temperatures up to 375 deg. F. is reported for an improved resin cement. Product is stated to have excellent rheological properties which minimize construction delays. Mortar does not tend to run out of joints and can be used on vertical and ceiling work without difficulty.

When measured by tentative A.S.T.M. methods, mortar has longer than usual working times and will set fairly rapidly to a dense solid throughout a temperature range of 40-100 deg. F.—*Atlas Mineral Products Co., Mertztown, Pa., and Houston 20.*

Circle 163C on Reader Service Card

New Product Extends Cooking Oil Life

Increased life of cooking oils is reported with use of a new product called Anco-X. New aid incorporates both anti-oxidant and anti-foam agents.

Anti-foam agents in new product are reported to permit heavier cooking loads, decrease fire hazard from boil over by preventing foaming, extend cooking oil life and result in more even browning. In use, a 6 oz. bottle is reported to service a 50 lb. capacity fryer for approximately a month of normal operation.—*L. A. Antle Co., Inc., Atlanta, Ga.*

Circle 163D on Reader Service Card

OTHER DEPARTMENTS Featured in This Issue

Practical Ideas ..... page 5
Editorials 164
New Packages & Products 170
Advances in Technology 177
Questions & Answers 194
Useful New Books 218
Keeping Up With the Field 221
Recent Inventions 251
Men & Companies 255
Just Off the Press 260

In Behalf of Progress . . .

Stingy FDA Budget Stymies Progress on Standards

Progress has been stymied in the important mandatory federal food standards program.

The reason? Inadequate funds!

Little is being done to complete the work on new standards in the making. Worse, procedures for amending existing standards to keep them abreast of developments have virtually halted.

To finance its whole enforcement program—excluding self-supporting certification activities—the Food & Drug Administration received only $5,200,000 for the current fiscal year, which ends June 30.

Therefore FDA has been forced to reduce the personnel engaged in research on standards and to cut the legal staff. As of mid-January, only one part-time Hearing Officer remained.

First call on the slim funds naturally goes to Food & Drug public health protection activities. The guard must be maintained against harmful adulteration of foods and against unsanitary conditions in food factories.

Food manufacturers do not want the protective measures curtailed. But neither do they want to see the standards program bogged down.

Still in the mill are several standards important to the industry and to the public. More are in formative stages, thanks to a great amount of time, effort, and money on the part of the industry.

Take canned foods for example. Caught in the stage of incompletion are standards of fill for canned corn; standards of identity, quality, and fill for canned pineapple; and the pending application to amend the catsup standard.

Important as it is to have standards for the good of the industry and the consumers, alteration of existing standards often is of greater import. The public will be denied worthwhile improvements in foods unless the standards can be changed.

But it seems that the federal budget makers are unaware of the folly of underfinancing FDA. Or they are pinching pennies where they will get the least howl.

So its time for food and consumer organizations, and leading food firms, to speak up in FDA's behalf.

Thirty percent of consumer expenditures go for food—or 67 billion dollars annually. The budget for FDA amounts to less than eight thousandths of one percent of the food bill. That seems to be a pretty picayune price to pay for protecting and improving the diet of the nation.

In fact, it's a ridiculous situation in view of government expenditure of millions of consumer tax dollars by the month to support food prices beyond their economic level.

Until more money is allotted to FDA—and it may be a long wait—food manufacturers should consider two ways around the standards roadblock.

The first is the experimental marketing of foods not conforming to existing standards, permitted under the law.

The second is the relaxing of standards procedures under the Hale bill, which it is hoped will be passed soon. This bill provides that a mandatory food standard may be issued, amended, or even repealed without a public hearing—where there is no controversial issue.

If all companies concerned refrain from creating controversies to gain a competitive advantage, there is real hope for aid from the Hale bill.

But only adequate funds for FDA will remove from the path of food progress the quagmire of inaction on standards.

Pesticide Bill Points Up Processor Problem

Indications are that the revised Miller pesticide bill will soon become a law.

This bill limits the application of the control measures to raw agricultural commodities. And no pesticide which leaves a residue will be used unless a tolerance has been established.

What does this mean to food processors using the raw materials? The Food, Drug & Cosmetic Act provides that a food is adulterated if it contains any poisonous or deleterious substance which may make it injurious to health.

It also provides for the establishment of tolerances for substances which cannot be avoided.

However, no such tolerances have been issued. And this puts the processor on a bit of a spot. So it is anticipated that a processed product will be considered within the law if it contains no more pesticide than the amount permitted on the raw material used—when removal of the chemical is impracticable. And wise processors will ask for guarantees from growers that spray-residue tolerances have not been exceeded.

But regardless of the law, no food processor will be happy about a product containing carryover pesticide. Most certainly his customers won't like it.

Which means that much more consideration and research should be devoted to means of removing residues from raw materials.

Although the amount of bug poison in a food be not dangerous—even on a cumulative basis—such material is anything but nutritious. And the more researchers learn about nutrition, the greater is the evidence that even traces of substances in the diet are of real biological significance.

Carload-to-Container Q.C.

—Continued from page 66

only a brief idea of the scope of laboratory operations, it does imply that most of this work is conducted at daily pace on a routine basis. Hence, the real task of the quality supervisor (rather than spinning red tape around a smoothly running lab force under competent control of the chief chemist) is to find out *what is wrong* whenever a deviation from quality-limits is turned up by routine.

Following up on such deviations and correcting for them can involve a variety of actions. So to frame the job properly, let us consider a typical day and its "case-histories":

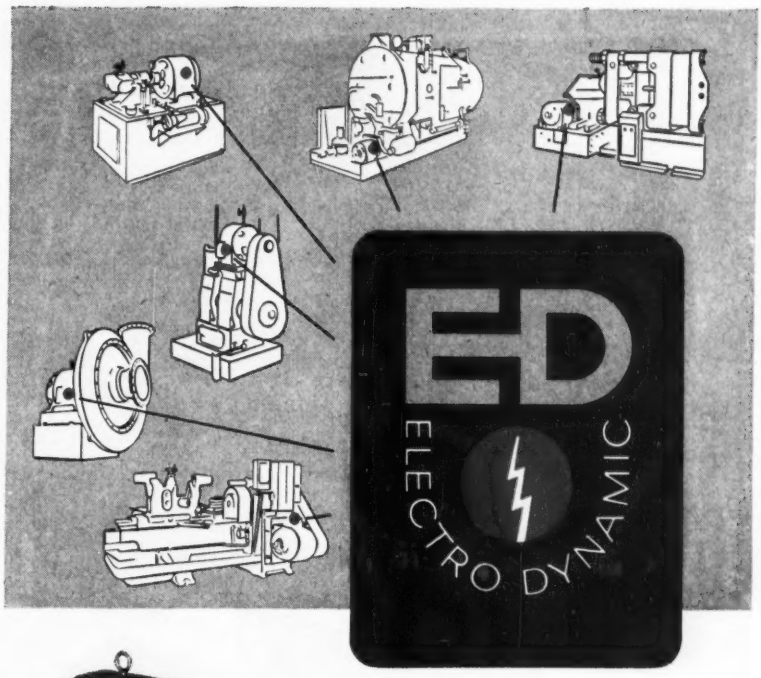
About the first check confronting the quality supervisor in the morning is a call at the Finished Products Laboratory to be sure that salad oil to be packed is up to standard. At the same time, prior day's product is viewed to note if it fell within correct consistency limits. And if, for example, a shortening is found too hard, then the process department is called and advised to lower its melting endpoint from hydrogenation.

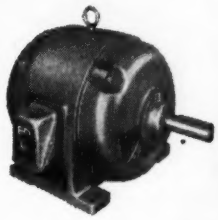
A call may then come in mid-morning to the effect that the taste panel has found an "off" flavor of some sort in, say, a margarine oil. This entails going over the records of the deodorizer with the process supervisor to try to spot the trouble. Usually vacuum or steam is at fault. This is corrected, and the oil is, of course, reprocessed.

Before lunch the Refining & Bleaching Laboratory indicates that color is too high in oil going to the winterizer. This is immediately reviewed over the records with the process supervisor. In this case all data indicates that sufficient bleaching was done and that the refining was removing the correct amount of color. Accordingly, instructions go out to change grades of crude oil to meet the specified color limit for winterizer oil.

In early afternoon the Finished Products Laboratory reports impurities in the salt to be used in margarine emulsion. This batch is automatically rejected and the quality supervisor gets into action to expedite a properly pure replacement salt batch.

Just before "quitting time" the Finished Products Lab advises that there are small streaks in the latest run of margarine. This smacks of possible formula trouble, so first check is with the emulsion operator to be sure that he is following—"by the numbers"—procedure outlined in Standard Operating Methods. An error, seemingly innocuous to the operator, is thus corrected and the below-standard mar-





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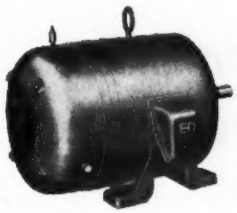

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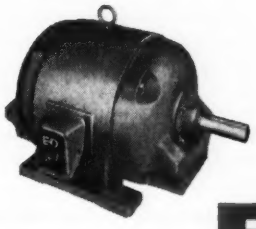

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Skeptical strong man makes Patapar underwater test

An easier way to test the *high wet-strength* of Patapar Vegetable Parchment is to place only the Patapar underwater. Soak it for hours and hours—even boil it. Patapar will keep its amazing wet-strength.

Resists grease, too

If grease is a problem, Patapar has the answer for that, too. It resists penetration of fats, grease and oils — a quality that makes it ideal as a food wrapper and for many other uses. In addition Patapar is NON-TOXIC.

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Patapar is produced in different types or variations that meet all sorts of exacting requirements. Some of its diversified uses: wrappers for butter, poultry, margarine, ham, bacon, cheese and other moist foods; milk can gaskets; rubber releasing separators; white print translucent masters for direct print machines; dialyzing membranes; in hospitals for wrapping articles to be sterilized in live steam. It is furnished in rolls or sheets, plain or beautifully printed with colorful designs.

In your business perhaps there is a job that could be done better with Patapar. Tell us about it, and we will send information and testing samples of the type of Patapar we recommend. Write today.

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garine lot accordingly is then rejected.

But actually, it is never "quitting time" on this interesting job.

For one thing, more efficient quality supervision—or faster, more precise trouble-shooting in the plant—relies on keeping abreast of the latest technical thinking in the industry. So the various technical journals are very much in the "must" reading category. Also, faithful attendance at American Oil Chemists' Society meetings is in order.

Even more imperative is the need to be completely aware of the latest desires of Mrs. Tucker's customers—for in the last analysis it is the quality supervisor's prime mission to bridge the gap between what buyers personally want and the large-scale, impersonal methods of the production floor.

End *(Resume reading on page 66)*

What Inspectors Can't Do
(Letters to the Editor)

—Continued from page 59

United States v. 75 Cases, 54 F. Supp. 641 (D. C. Md. 1944)] the court merely decided that the defendant had given specific consent to an inspection and to the taking of photographs. There was no discussion by the court on whether the right to inspect included the right to take photographs.

If anything, this case can be utilized for the theory that the right to inspect does not include the right to take photographs, since the court found as a fact that the food operator had specifically consented both to the inspection and to the taking of photographs.

And if photographing is included within the purview of an inspection, why was it necessary for the court to find that two consents were necessary instead of merely one?

In the present state of the law, with no Appellate decision available on the subject, food plant operators should be advised that there is a grave doubt concerning the power of Food & Drug men to photograph different portions of their plant during a routine inspection. The operator should then decide, after consultation with his attorney, whether he will or will not permit photographs.

Without this knowledge at his disposal, a food plant operator will usually permit the taking of photographs as part of a routine inspection. If the case reaches the courts and the food plant operator then wished to assert his rights in order to avoid a possible jail sentence, the government will invariably argue that he waived his

rights by not objecting at the time the photographs were taken.

In other words, if the food plant operator does not desire to permit the taking of photographs, the objection must be raised at the time the Food & Drug men are in his plant.

Mr. Holmes is correct in asserting that the Food & Drug men make good use of photographs against a food plant operator in a court case. However . . . in the present state of the law, it is discretionary with them as to whether they will or will not permit the taking of photographs, and they should be further advised that any such photographs may be later utilized against them in criminal proceedings.

The writer has not in this letter expressed any opinion as to whether a food plant operator doing business in a non-corporate form must allow an inspection under the 1953 amendment to the law, or whether he has a right, under the Fourth Amendment of the Federal Constitution, to refuse any access to the plant by a Food & Drug man in the absence of a search warrant.

This is a highly complex subject as is evidenced by the majority and minority reports by the House Committee on Interstate & Foreign Commerce. The writer, in an article to be published, has analyzed all the available material. Ultimately, the question will have to be decided by the United States Supreme Court.—*Joseph Winston, Law Offices, Ridgewood, N. Y.*

Author Replies to Comment

(Letters to the Editor)

—*Continued from page 59*

operate a sanitary plant, rather than think up all of the restrictive measures which might be legally possible.

If an injustice is ever done, for conceivably one can occur, then there will be ample opportunity to dream up legal technicalities through which such an injustice can be remedied.

Mr. Winston makes a good point in the fact that once a manufacturer does permit an action such as taking of photographs during the course of an inspection, he probably has no recourse later in the courts.

However, it was not the purpose of my recent article to discuss the recourses which manufacturers might have at court, but rather what they are to expect from a Food & Drug inspection. F&DA inspectors, just as individuals in other organizations, vary in knowledge, training, and ability.

The situations outlined in the writer's article are such that it is hoped the entire field has been covered from the viewpoint of what can be expected from the most efficient and best informed inspector. In other words, these are the situations that the food manufacturer is expected to study in order to prepare a program of preventive sanitation to prevent conditions serious enough to cause regulatory action.—*Edward L. Holmes, Executive Director, American Sanitation Institute, St. Louis, Mo.*

End (Resume reading on page 60)

Enzyme Tablets

—*Continued from page 59*

the finished loaf has a smoother shred and is more uniform in shape.

Up until the introduction of fungal enzymes, bakers had used disastatic malt as their chief source of enzymes. However, diastatic malt essentially contains the diastase or amylase factor, with no standardized protease.

Amylase and protease occur naturally in wheat flour, but a number of factors have been responsible for their deficiency in wheat—particularly during the past decade. One reason for it is the present method of harvesting wheat with the combine. Years ago, wheats had more amylase and protease when they were harvested with a binder and then permitted to stand in the shock and stack for a month or so. Also, new wheat varieties have developed tougher gluten, which is more difficult to mix and then handle through the automatic dough dividers, rounders, and molders.

Supplementing the natural protease in flour with additional protease has helped a great deal.

The miller has done a great deal to supplement the natural enzyme deficiency in flour by adding a small amount of specially-treated germinated wheat, which contains a high concentration of diastatic enzymes but not any appreciable standardized quantity of protease enzymes. The miller cannot safely add all the diastase needed by the baker. The type of bread, formula, and process actually determine the optimum amount of needed enzymes. Thus, the final enzyme adjustment is left to the baker.

Now Come the Fungals

Fungal enzymes have been available in dilute powder form for several years. Only recently have they been available in convenient, individual, concentrated tablet form—one amylase and the other protease. Usually, only one to two of these tablets are needed for each 100 lb. of flour. Most diluted powdered fungal enzymes contain amylase and protease in a fixed propor-

Is Contamination Gouging your Production?

Despite the strictest sanitation measures, foods being processed are constantly attacked by airborne bacteria and mold. Gaining a foothold, these invisible demons cause contamination. And even the slightest degree of contamination costs you lost production due to scrapping, waste, and rejects. Quality and flavor are impaired, and even customers can be lost. Yet many food processors have solved this production problem simply and effectively, by reducing contamination with WESTINGHOUSE STERILAMPS.

WESTINGHOUSE STERILAMPS are being used successfully in many industries where contamination due to airborne bacteria or mold WAS a production problem. In just a few minutes, you can find out for yourself how WESTINGHOUSE STERILAMPS fit your specific needs.

WESTINGHOUSE LAMP DIVISION
Dept. FE3, Bloomfield, N. J.

Without cost or obligation, I would like to know more about how Westinghouse Sterilamps help control contamination.

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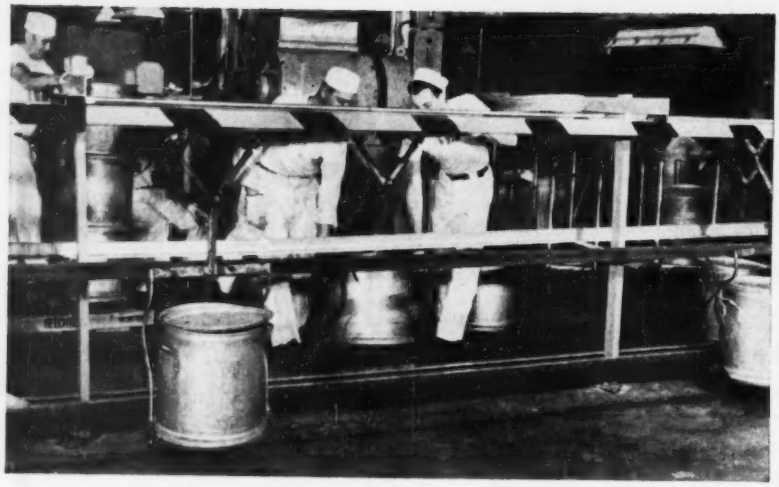


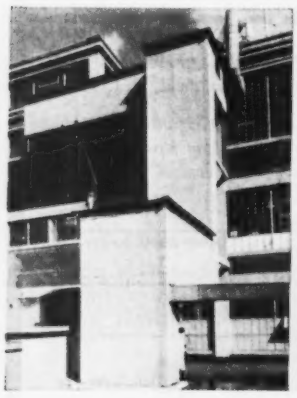
• Stock pots of freshly cleaned vegetables being placed on "Zig-Zag" Conveyor racks for trip to straining and cooking department.

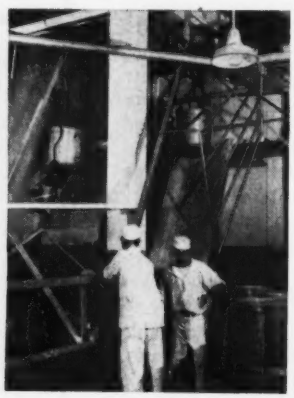
How "Zig-Zag®" Conveyor

Raises vegetables... and lowers costs!

Moving vegetables from stage to stage during processing can put a heavy load on manpower and production costs. Beechnut Packing Company has solved the problem in its plant at Canajoharie, N. Y., by the use of a "Zig-Zag" Continuous Power Conveyor. Manual handling of vegetables, from washing to straining and cooking is reduced to a minimum as "Zig-Zag" carries loaded containers between processing stages.

Lowering of production costs is one of the best safeguards against the pressure of competition, and "Zig-Zag" may be the answer to *your* problems. Why not find out? A Richards-Wilcox conveyor engineer will gladly arrange consultation without obligation. Write for complete details.





• Left, conveyor shaft built on exterior of Beechnut plant. Stock pots travel through roof of ground floor and are raised to fourth-floor level of straining and cooking department.

• Right, entry of conveyor into straining and cooking department. Note how flexing arm of conveyor pendant permits sharp-angle rise drop of stock pots.

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tion, and the amount of either enzyme going into a dough can only be changed by varying both.

Separate amylase and protease tablets now make it possible for the baker to conveniently vary either of these essential enzymes to his own requirements. For example, if the baker is using 100% Southwestern winter wheat flour (which often has a soft mellow type of gluten), he would find less protease required than if he were using a stronger gluten spring wheat flour. On the other hand, requirements for additional amylase may be the same with either of these flours.

The baker using either type of flour, or a blend of them, can very easily adjust the amount of protease supplementation required by adding tablets. This flexibility is an important benefit in production.

After comprehensive use of these tablets, it has been observed that there is more frequent need for adjusting the amount of protease than amylase.

To help the baker arrive at the proper level of amylase and protease, the maker of the tablets has prepared a simple, but comprehensive chart. Where amylase and protease requirements are unknown, the baker should first use 2 amylase tablets per 100 lb. of flour in the dough formula. In subsequent doughs, he should gradually substitute 1, 2, or 3 protease tablets (depending upon the size of the dough) for an equal number of amylase tablets (as shown in the table).

Tests should be run on only one or two doughs each day, with the baker following through by observing the mixing time to clean-up point, the mellowness or pliability of the dough, and the effect on the finished bread. As protease tablets are gradually increased, he will observe an increasingly more mellow and pliable dough. As soon as the dough becomes too soft for best handling, he will know that the optimum level has been exceeded. Then he can adjust the next dough accordingly. With this procedure, he can arrive at the optimum protease level safely and accurately.

Protease tablets also contain a small amount of amylase. This is natural in manufacturing them, and is the reason for reducing amylase while increasing protease in accordance with the above procedure.

The amylase factor is not a critical one. An excessive amount of fungal amylase, used over and above the necessary requirements, will be of no benefit—but neither will it be harmful.

The baker, however, must be careful in using protease. If the flour requires little proteolytic supplementation, and an excessive amount is added, it may result in a soft, slack dough.

End (*Resume reading on page 59*)

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NEW PACKAGES & PRODUCTS

INTERNATIONAL FLAVOR evident at National Frozen Food Convention is shown in wide variety of foreign food specialties featured at the booths. Chinese, French, Jewish, and Italian prepared frozen foods mirror a new trend in the fast-moving field.

New Trends Mirrored at Frozen Food Show

A marked trend toward processing of specialty food items in the prepared frozen food field was evident at the recent three-day meeting of the National Frozen Food Convention in New York. Specialties ranging from boned Normandy trout to cherry-flavored blintzes indicated a strong attempt to capitalize on current consumer interest in convenient heat-and-eat foods.

FROZEN DINNERS as marketed by C. A. Swanson & Sons, Omaha, and Quaker State Foods Corp., Pittsburgh, offer consumer a quick and tasty meal.

An international flavor was added by the large number of foreign food specialties. Noteworthy in the luxury bracket was a series of gourmet-worthy foods by Maxim's, Ltd., a Parisian processor. Offered were fillets de sole Maxim's, sauted with a sauce of butter, vermouth and shallots; boned Normandy trout in champagne and cream sauce; beef mulled in beer with vegetables; veal in white cream sauce; veal sauced in champagne, butter, and cream; and lamb with vegetables and white wine sauce. Average weight is 18 oz.

Retail price ranges from $2.05 to $2.75, with a general mark-up of 40% on processors price. Specialties are packed in a heavy-gage aluminum tray and overwrapped with glassy, color-printed paper illustrating contents.

In tune with the never-waning popularity of Chinese food, 25 processors are now manufacturing prepared Chinese specialties in frozen form. Products of three processors were displayed. Complete line of Temple's Frosted Foods, Inc., New York, included chow meins (chicken, shrimp, and vegetable), fried rice, and egg rolls, and shrimp chow mein packed in brightly colored cello-wrapped cartons. Also packed where frozen won ton, egg drop, and noodle soups in 15-oz. waxed paper cups.

Golden Palace Food Products, New York, showed its line of frozen egg rolls with Chinese mustard, fried rice with chicken, shrimp chow mein or chop suey, and vegetable chow mein or chop suey as well as won ton soup. Products feature a new four-color insert label for quick identification.

Chin & Lee Co., Inc., New York, came up with its

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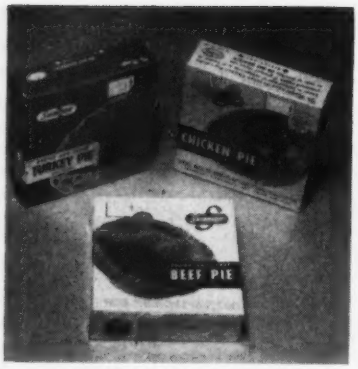

POT PIES in turkey, beef, and chicken, were highlighted at C. A. Swanson's booth at the National Frozen Food Convention.

FISH STICKS and novelty food specialties as processed by Birds-Eye Div., Seapak Corp., and Eat-All Frozen Foods Co., Inc.

frozen vegetable chow mein in a 12-oz. carton.

Roman Ravioli, Inc., So. Hackensack, N. J., revealed its line of Italian specialties—pizza pie with mozzarelle in a 7-oz. unit carton, 24 ravioli (with meat) in an 8-oz. carton, and 4 manicotti in a 9-oz. carton.

Also in the Italian vein is an 8¼-oz. can of frozen spaghetti sauce produced by Foodways Inc., New York, under Dorann Farms label. Concentrated product requires water to make a pint serving six to eight people.

Blintzes (cheese, potato, cherry, blueberry, and strawberry flavors), a Jewish specialty resembling crepes suzettes were shown by Milady Food Products Inc., New York. Packed in 8-oz. cartons and overwrapped with cellophane, blintzes are merely browned before serving.

Four-and-Twenty Blackbirds

Ever-popular pot pies—turkey, chicken, and beef—were displayed by C. A. Swanson & Sons, Omaha, Neb., in 8-oz. aluminum pans packed in waxed, cello-wrapped cartons.

The phenomenal success of breaded, fried fish sticks was evident by the brands displayed. Included were those shown by Birds-Eye Div., General Foods Corp.; Snow Crop Div. of Clinton Foods; Gulf Stream Quick Frozen Foods, Inc.; Fulham Bros., Inc.; and Seapack Corp.

Novel seafood specialties were exhibited by Eat-All Frozen Food Co., Inc., Philadelphia. Called Clamettes, Lobsterettes, and Salmonettes, products are bite-size balls of seasoned seafoods. Twelve of a kind are packed in 6-oz. cartons.

Mirroring another trend in the frozen prepared food field are the frozen dinners by Quaker State Foods Corp., Pittsburgh, and C. A. Swanson & Sons, Omaha, Neb.

Quaker State products, marketed under the One Eyed Eskimo brand name, were offered in three styles—turkey and vegetable, with giblet gravy, sweet potatoes and green peas; pot roast of beef with jardiniere sauce, potatoes au gratin and green peas; and Swiss steak with mignon sauce, delmonico potatoes, and green peas. Products are portioned on a heavy-gage, sectioned, 12-oz. aluminum tray that's packed in a cellowrapped carton.

An attractive package design highlights Swanson's turkey dinner (12 oz.). Resembling the front of a television set, to conform with the TV Dinner label, front panel reveals a tempting illustration of the tray ready for serving as viewed through the TV screen. Except for back panel featuring instructions for preparation, overwrap is printed in a simulated wood paneling. Dinner contains turkey with giblet gravy, dressing, sweet potatoes, and peas.

Frozen Spuds

Frozen potato products were not neglected by exhibitors at the convention. J. R. Simplot Co., Caldwell, Idaho, presented a 10-oz. package of shredded mashed potatoes, and diced Idaho potatoes featuring onion flavor.

Ore-Ida Potato Products, Inc., Ontarion, Ore., exhibited its package of four 3-oz. shredded potato patties with added salt and flour.

Supplementing their line of blintzes, Milady Food Products, Inc., New York, also revealed its home-style potato pancakes, packed four to a 6-oz. carton. Pancakes contain potatoes, onions, flour, fresh eggs, pepper, sour cream, vegetable shortening and salt.

Dietetic Lemon Drink

Reported as the only non-carbonated, dietetic drink in concentrated form, Sunny Meadows Lemon Drink is being produced by Sunny Meadows

Food Co., Poughkeepsie, N. Y. Packed in an 8-oz. can, concentrate requires only water to make a quart of sweet lemonade. Product is sugar-free, and is distributed in either frozen or non-frozen form.

Companion Coffee Debut

Introduced as a companion coffee to Nescafe, Nestles Instant Coffee is being marketed by Nestle Co., Inc., New York, in 2- and 4-oz. jars. Reason for second brand is wide variance in public tastes.

Darker than most "solubles," and granular rather than powdery, this instant coffee dissolves readily in ice water.

Label is simple and attractive. Identification is printed in red and blue on a yellow band, while a side panel lists instructions for preparing the coffee.

Convenient Cap

A newly designed vacuum lug seal that can be easily removed by consumers is currently in use for H. J. Heinz Co.'s line of pickles and relishes. Manufactured by Crown Cork & Seal Co., the new cap is removed by hand twisting. It is not damaged during removal, and can be readily resealed.

New jar also features a wide mouth jar for easy removal of contents.

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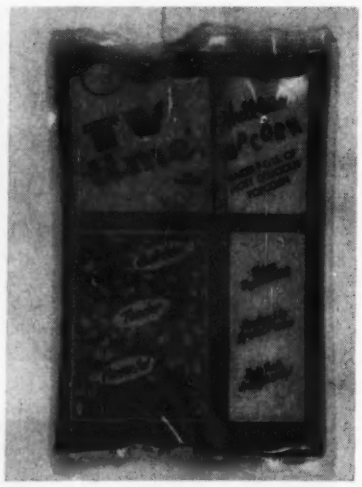
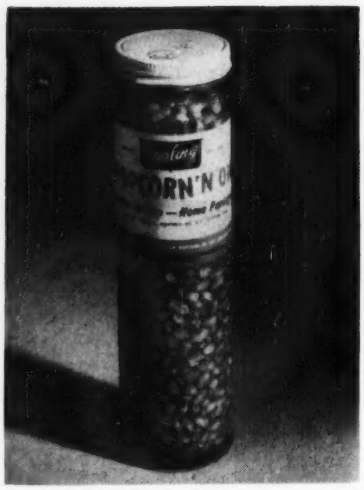




Popcorn Makings Gain in Popularity

Latest entries in the popcorn kit field are Sterling Sales Co., Jamaica, N. Y., and TV Time Foods, Chicago. On a new tack is the flexible polyethylene pouch used by TV Time Foods.

The necessary ingredients for home popping of three quarts of corn are contained in the divided package. Oil in stick form is separated from the corn and salt. Requiring only heating, the product is easy to prepare. Label is of blue on transparent wrap.

Contrasting is Sterling Sales Co.'s 11½-oz. jar, where corn and oil are mixed. Making a total of 7½-qts. popcorn, the product may be used in desired portions.

Meatballs Galore

Ten braised beef meatballs and spaghetti with tomato sauce are packed in a new 2½-lb. can by Chef Boy-Ar-Dee Co., Milton, Pa. Following the "family size" trend, product serves five. Label design follows same style as manufacturer's 8- and 12-oz. cans.

Mix Family Addition

Betty Crocker Angel Food Mix is the latest addition to General Mills, Inc.'s line of cake mixes. Unique in that the problem of preparing egg whites for a packaged mix has been overcome, the product is reported to fully equal the standard thirteen-egg angel food mix.

Each 17-oz. package contains two inner units; one holding egg-white mix, the other flour mix. Contents are mixed with water according to directions on package, while flavoring is added, as desired by consumer.

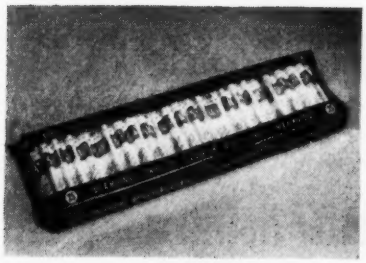
Ready-Made Pie Fillings

Prepared fillings for cakes, pastries, and desserts, are being produced by Sokol & Co., Chicago, in poppy, rum-raisin, prune, datenut, almond, and apricot. Marketed under the "Solo" label, the fillings are packed in 12-oz. cans. The colorful red, blue, and white label illustrates can contents, as applied in a recipe on reverse of label.

Six Birds in a Box

Fully dressed poultry is packed six to a telescope-design carton developed for Koppenhofer Bros., Deshler, O., by Hinde & Dauch Paper Co., Sandusky, O. Printed in red and blue on corrugated board, carton illustrates a well-dressed rooster.

Designed for the shipment of fresh



Portion Control Plus

Twenty-five individual servings of salt are packed in a cellophane overwrapped paperboard tray developed by Diamond Crystal-Colonial Salt Div., General Foods Corp. Ideal for picnics or lunch boxes, salt packets are corrugated and designed for uniform spreading of the salt when poured.

or frozen poultry, carton has special die-cut holes on two ends of body to aid freezing.

New Carry-Home Container

Paper stock of virgin kraft is used in a new line of carry-home cartons designed by Atlanta Paper Co., Atlanta, Ga., for Borden Milk Co.'s canned evaporated milk. Carton is water and moisture resistant, and kraft stock prevents tearing of carrying handles. Printing is by flexographic process and carton takes ink readily with sharpness of outline.

For Package Data Use Reader Service, p. 179

New-Product Shorts

Condensed Onion Soup
Campbell Soup Co., Camden, N. J., is marketing a new canned condensed onion soup.

North of the Border
Pan Torilla Bakery, New York, is marketing a hermetically sealed cellophane package containing a dozen torillas.

Cheese 'N Lox
A blend of cream cheese and specially cured lox is being marketed in 8-oz. reusable plastic container by Daitch Crystal Dairies, Inc., under product name, Cheese-Lox.

King-Size Salad Dressing
Kansas City Wish-Bone Salad Dressing Co., Inc., is now packaging Italian salad dressing in 16-oz. bottles.

Chocolate Family
A series of cellophane packages of identical design are being used by Rockwood Co., New York, for their line of chocolates.

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INSIDE SCIENCE

White Flour in the U.S.A.—

Enriched* with Vitamins and Minerals for Better Nutrition

by Science Writer

This article is one of a series devoted to the enrichment of family white flour, white bread and rolls, corn meal and grits, macaroni products and white rice.

The enrichment of family white flour with thiamine, riboflavin, niacin and iron by American millers is a major success. It has made great contributions to better health in the United States by improving a staple food.

Since the start of the program in 1941 by millers, voluntarily, the evidence is conclusive that enrichment not only has reduced the number of cases of certain dietary diseases but also is promoting the mental and physical vigor and well-being of the U. S. population generally. Because of its demonstrated value, the principle and practice of enrichment have been applied to other foods made from grains: corn meal and grits, white rice, macaroni, spaghetti, noodles, pastina, farina—and, of course, to white bread and rolls.

Doctors and diet experts have long supported white flour enrichment. The Council on Foods and Nutrition of the American Medical Association and the Food and Nutrition Board of the National Research Council are on record as endorsing the practice.

The legislatures of a majority of the States plus Hawaii and Puerto Rico have enacted laws which make mandatory the enrichment of all family white flour, as well as white bread, sold commercially in those areas.

American homemakers, too, favor foods they know to be enriched—a fact demonstrated by surveys. They look for these words on package labels: "Enriched with vitamins and minerals for better nutrition."

What Is Enrichment?

It's an axiom in the milling industry that consumers want beautifully fine, white flour. When wheat is milled and processed to get the white flour which the public demands, vitamin and mineral values are unavoidably lost.

Enrichment restores to white flour the following important vitamin and mineral factors: thiamine, riboflavin, niacin and iron. Calcium also may be added as an optional ingredient. The process is simple and inexpensive. A mixture of the vitamins and iron is fed into the flour stream during processing. This insures that the enriching ingredients are spread evenly throughout the flour.

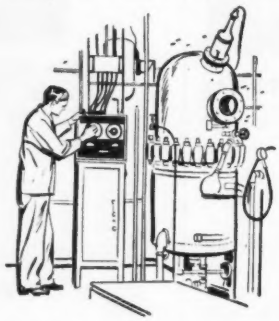
The U. S. Food and Drug Administration has established standards which white flour must meet to be properly labeled enriched. The requirements, in milligrams per pound, are:

	Min.	*Max.*
Thiamine (vitamin B_1)	2.0	2.5
Riboflavin (vitamin B_2)	1.2	1.5
Niacin (another "B" vitamin)	16.0	20.0
Iron	13.0	16.5

(In Canada, too, the same standards have been set for enriched white flour through the amendment of the Food and Drugs Act.)

Vitamins Are Made

The science of chemistry is so advanced these days that many of Nature's complex substances can be "duplicated" in the laboratory. This has happened with many vitamins. First, the chemical composition is learned. Second, the pure substance is isolated. Third, a "duplicate" is made by synthesis. And fourth, the laboratory techniques are extended to large scale operation.



The manufactured "duplicate" is identical chemically and in biological activity with Nature's own product. A vitamin is still a vitamin regardless of its source. So efficient is large scale manufacturing that vitamins are sold at a lower cost than if they were extracted from natural sources.

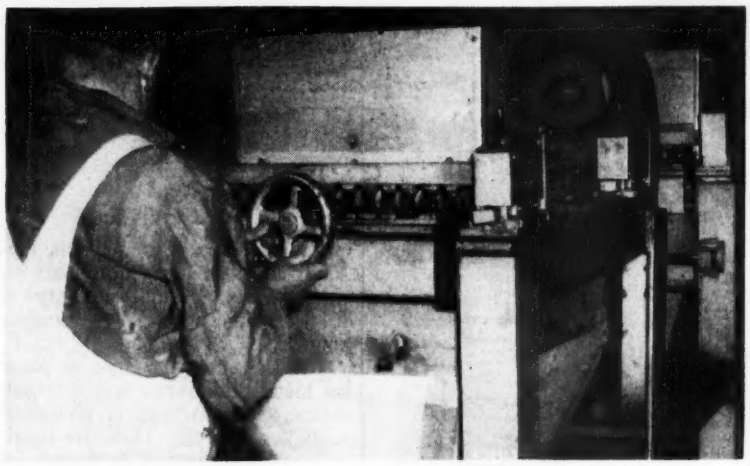
The Hoffmann-La Roche people make top quality vitamins actually by the tons. To do this they use amazingly complex processes with scientific production controls and the latest equipment which fill buildings each a city block square and many stories high.

Reprints of this article, and all others in this series are available without charge. Please send your request to the Vitamin Division, Hoffmann-La Roche Inc., Nutley 10, New Jersey. In Canada: Hoffmann-La Roche Ltd., 286 St. Paul Street, West; Montreal, Quebec.

The watermills are gone. Today's needs require today's methods. How sensible it is that millers across the nation restore health-giving vitamins and minerals through enrichment.

*Webster's Merriam Collegiate Dictionary includes this definition of "enrich": "to improve (a food) in nutritive value by addition in processing of vitamins and minerals".

ADVANCES IN TECHNOLOGY



Cool Milling Preserves Freshness, Nutritive Value Of Flour, Cereal Products Made From Wheat

Preventing loss in nutritive value resulting from heating during conventional milling is object of the new processing method of cool-milling wheat and wheat products.

The special machine (photo above) devised for this process has been granted a Canadian patent. It is simple in construction, and can be built in units of various sizes to suit needs of users. Simple adjustments are provided for milling various grades from very fine bread flour to very coarse cereals.

Patentee recommends that bakers install units in their production lines to insure maximum freshness in baked products. Also suggested is installation of mills in grocery stores to supply customers with the freshly milled products.

Digest from Canadian Patent 420,886 granted to Mrs. Jane Barclay Evans, 98 Tuxedo Ave., South, Hamilton, Ontario.

Microorganisms Responsible For Heating of Grains

Heating of stored damp wheat is now known to be caused by sub-epidermal fungi thought to be transmitted through the wheat stem.

This conclusion was arrived at after more than 9 yr. of study on the part of staff members of the Pest Infestation Laboratory, Dept. of Scientific & Industrial Research of England.

Beginning with the observation that CO_2, given off by stored wheat, was produced almost entirely by microorganisms, workers attempted to locate them. Specimens of "beeswing" (obtained by soaking grains in water ½ hr. and dissecting the outermost layer), mounted on microscopic slides and suitably stained, showed fungi on the inside of the skin. These were shown responsible for 90-95% of the respiration.

Further tests, with samples of wheat from 98 different areas throughout the world, showed that sub-epidermal fungus were present in all but 5 varieties. These were grown under irrigation. No correlation could be found between temperature and fungal score, but there was evidence of a relationship between variety and amount of fungus.

A study was then conducted to find at what stage of wheat development the fungi made its entry. No fungus could be detected until about 2 weeks before harvest, when moisture content of grain averaged 47%. It appeared simultaneously in about 30% of the grains and spread rapidly until, at harvest time, all were infected.

Although origin of the fungi is still unknown, two possibilities are being investigated: (1) They grow on decaying remains of the flower and are introduced into the grain from an outside source, and (2) the mycelium may be developed from a systematic infection of the wheat plant.

While the first possibility cannot be excluded, there is strong evidence to support the theory that the fungus grows up from the stem inside the plant.

Digest from "Sub-Epidermal Fungi In Wheat Grains," by A. G. Thomson, *FOOD Processing, Packaging, Marketing*, 15-17, Jan. 1954. (Pub. in London.)

BAKING

Studies of Batter Process

Loaves of bread made by the "batter" process of Rank and Hay (British Patent No. 646,311, 1950) have properties and appearance similar in most respects to those made with flour treated with nitrogen trichloride.

In the process, flour and water mixtures are beaten at high speed in a special machine before incorporating the mixture into a dough. When carried out in an atmosphere of nitrogen, the batter process yields a loaf from unbleached flour (U. K. National flour) of smaller volume than that obtained from a straight dough mixed in air. This indicates that an oxidation effect is at work, but loaves made from defatted flour indicated that unsaturated fat oxidases are not involved, since the batter process in air still yielded a larger loaf.

When straight doughs from the unbleached flour were mixed in the usual mixer in an atmosphere of oxygen, loaves matched those from the batter process closely, which indicates that

INDEX TO ABSTRACTS

CEREAL PRODUCTS

Cool Milling Preserves Freshness of Flour 177
Microorganisms Responsible for Heating of Grains 177

BAKING

Studies of Batter Process 177

FATS & OILS

Acids as Fat Stabilizers 178

BEVERAGES

Beer Filtration Methods 178

DAIRY

Vegetable Fat Milk Powder 181
Effect of Mixing Time on Bulk Milk Samples 182

PACKAGING

Protects Labels During Casing .. 182

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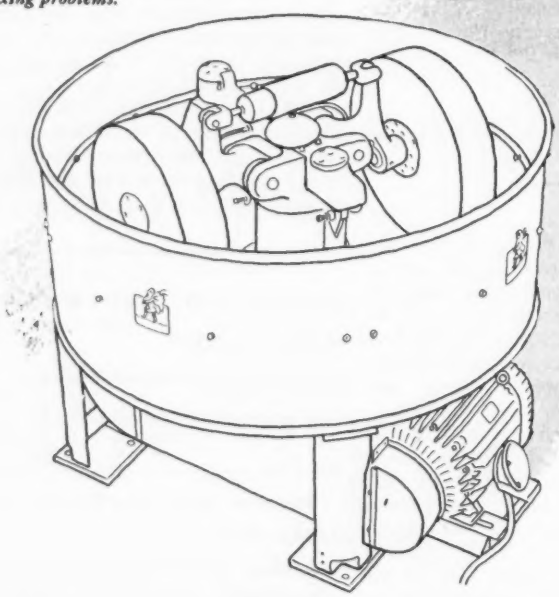

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this process gets its loaf improvement from oxygenation of the batter during the high speed mixing. Bleaching effect of the batter process is catalyzed by lipoxidases requiring molecular oxygen.

Digest from "The Bleaching and Improvement of Bread Doughs," by J. P. Todd, J. Hawthorn, and J. A. Blain, *Chemistry & Industry*, 50, Jan. 9, 1954.

FATS & OILS

Acids As Fat Stabilizers

Fat stabilizers of the phenolic type, such as gallates or substituted hydroxyanisoles, are not permitted in England and most West European countries.

Reliance must therefore be placed on metal deactivators and synergists, maleic, citric, tartaric, or phosphoric acids, for example. These are usually considered ineffective in animal fats which lack natural antioxidants. However, incorporation of 0.01% aqueous citric acid or tartaric acid into beef or mutton fat, and lard, has been found to extend time required for onset of rancidity with aeration at 100 C, 50-100%.

Citric acid can be incorporated in a mixture of mono-, di-, and triglycerides at 130 C. A glassy product of high acid value (89) results. It is soluble in alcohol and petroleum ether, and forms true solutions with fats.

Lard, beef and mutton tallow containing 0.1-1.0% of these stabilizers were 1.5-4 times as stable to oxidation and peroxide formation as untreated fats. Tartaric acid reacts with monoglycerides with difficulty and its products have low acid values (below 20).

Digest from "Non-Toxic Stabilizers for Animal Fats," by L. Hartman, *Journal of the Science of Food & Agriculture*, 430-33, Sept. 1953.

BEVERAGES

Beer Filtration Methods

According to De Clerck, beer filtration ought to remove "only the turbidity and none of the components." However, few filtering systems attain this ideal.

Filter-mass filters and sheet-filters using filter pads of asbestos and cellulosic pulp in varying proportions, absorb more or less color, nitrogenous material, and foaming constituents, especially from the first portion of the beer put through them.

Diatomaceous earth filters of the screen type are relatively non-absorbent, but do permit occasional escape

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QUICK PRODUCT-FINDER

Acid, ascorbic 235
Adhesives 10
Agitators 260
Air-conditioning equip...38, 253, 262
Fans 188
Instruments 27
Amino 269
Anti-foam agents 163, 232
Antioxidants 163, 266
Ascorbate, sodium 235
Banders 150
Batteries 239
Bearings, roller 22
Blanchers 8, 61
Blenders 144, 161
Boilers 149, 262
Bolts 241
Brine equip. 39, 139
Bundlers 123, 150
Burners 149
Can-making mach...60, 124-125
Slitters 120, 125
Straightener 60
Cans, lithographed.....86, 133
Carbides 135
Casters 129, 267
Chains 29, 269
Chambers, vac.-pres. 257
Chemicals 269, 272
Chillers, water 258
Circulating unit 61
Cleaning equip. 197
Flotation 8
Nozzles, spray..248, 261, 269
Scrubber 197
Vacuum cleaner 197
Vacuum mach. 260
Washers 8, 61
Cleaning mtls....197, 230, 255
Descalers 230
Detergents 172, 230
Closures 60, 173
Cloth, wire 218
Coders 130, 247, 272
Colloids 261
Compressors.....200, 205, 212, 220, 237, 262
Condensors 162, 250
Cookers 86, 63
Pressure 63
Sterilizing 63
Coolers 63
Water 258
Containers 163
Aluminum 131
Bags 116
Boxes....110, 138, 173, 279
Cans.....86, 91, 118, 133
Carry-home type 175
Cartons 175
Designers 115
Directory 272
Drums 94, 133
Foil 265
Glass 122
Plastic 113, 116
Controls 175, 265
Atmosphere 127
Brine 216
Central 149
Density 216
Detectors 62, 213
Dust 152
Flow 151
Freezing 112
Hygrometers 265
Level 176
Meters 206, 224, 265
Microscope 269
Moisture 265
pH 53, 224
Pressure 186, 236
Recorders 62, 175, 265
Retort 147, 236
Scales 88, 99, 161
Temperature.....12, 27, 62, 186, 234, 236, 253, 265
Viscosity 62, 265
Weight 99, 133
Conveyor belting 259, 262
Canvas 61
Cotton 210, 241
Metal 233, 237
Neoprene-cotton 223
Rubber 19, 265

CONTINUED ON OTHER SIDE

HERE'S A HANDY INDEX to equipment, supplies and processes discussed in this issue

Simply circle page numbers of items which interest you. More information will come to you direct from suppliers.

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CIRCLE PAGE NUMBERS BELOW

2 Vanillin
4 All items shown
4a Bul. 51B6210
4b Bul. 51B7225
4c Bul. 51B7286
6 Tank cars
8 All items shown
8a 8-station filler
8b Pea grader
8c Flotation cleaner
8d 15-station filler
8e Blancher
8f Rotary washer
8g Conveyor
8h Quality grader
10 Adhesives
12 All items shown
12a Steam traps
12b Bul. 1025
12c Strainers
14-15 Sucaryl
16 Gas
17 Steel Selector
18 Motors
19 Ribflex belting
20 Valves
21 Mixer Bul. 500
22 Roller bearings
23 Conveyor Bk. 2289
24 Insulation mtls.
25 Maple flavor
26-27 Temp. control
28 Alum. jacketing
29 Swivel chains
30 Heat exchanger
31a Beverage vitamins
31b Vitamins
32-33 ph Cat. 1550, Data 9.4-9
35-36 Votator Bk. V-39
37 Mycotex
38 Precipitron
39 All items shown
39a Brinemaker
39b Canning salt
39c Bulk salter
39d Tablet depositor
40 Stainless steel
60A Catsup caps
60B Strip-feed press
60C Labeler
60D Fil-Mor unit
60E Wire member
60F Can straightener
61A Insinger washer
61B Labeler
61C Portable circ. unit
61D Viner apron
61E Can filler
61F Portable viner
61G Blancher
62A Transit controls
62B Viscometer, recorder
62C Labeler 250
62D Detector
62E Key grader
62F Case sealer
62G Freezer plates
63A Dicer
63B Lye peeler
63C Mix-cooker
63D Pressure cooker
63E Disintegrator
63F Agi-Tort cooker-cooler
63G Pres. cooker, cooler
86 Lithographed cans
88 Pneumatron Bul. 122
91 Cans
94 Steel drums
96 "Story of Starches"
99 Datamatic
100 Scotch tape
103 Overwraps
108-109 All items shown
109a Palletizers
109b Gluers
109c Sealers
109d Carton inserter
110 Boxes
111 Heat-exch. Bk. 837
113 Polyethylene
114 Fillers
115 Package design
116 All items shown
116a Paper bags
116b Multiwall bags
116c Polytex bags
116d Vision-Aire bags
117 Decitron counters
118 Cans
119 Alathon
120 Slitter Cat. 36-A
121 Visqueen
122 Glass containers
123 All items shown
123a Cocoa-liquor filler
123b Weighers
123c Wrappers
123d Bundlers
123e Printers
124-125 All items shown
124a Body flanger
124b Scroll shear
124c Bodymaker
125a Slitter
125b Feed press
125c Can tester
126 Wrapper
127 Atmosphere contr.
128 Carton former
129a Trucks
129b Casters
130 Tickometer
131 Ekco-Foil
132 Synchromatic
133a Lithographed cans
133b Lithographed drums
134 Packer-Gluer
135 Roko-Lift
136 Bee-Line labeler
137a Motor Bul. FE 3304
137b Consolidated Cat. FE 3310
138 Corrug. cartons
139a Lixate process
139b Salt
144 All items shown
144a Air separator
144b Grinders
144c Ring-Roll mills
144d Crushing rolls
144e Blender
145 Valves
146 Cocoa-Liquor mill
147A Filler
147B Retort controls
148A Valve Fig. 3151
148B Fork Truck
148C Filler R-1
149A Control center
149B Shaker pans
149C Burner-boiler
150 All items shown
150a Bundling mach.
150b Banding mach.
150c Multi-wrapper
150d High-speed wrapper

LISTINGS CONTINUED ON OTHER SIDE

Tear on dotted line

INDEX to equipment, supplies and processes in this issue (See other side)

Conveyors 168
Accessories 90
Apron 155
Cleat-type 259
Gooseneck 8
Gravity 237
Pallet 189
Recorders 157
Screw 23
Telescopic 157
Tubular 264
Vertical 135
Counters 117, 130
Cranes 229
Crushers 144
Deaerators 183
Decolorizers 242
Design, package 115
Desiccant 269
Detectors 62
Detectors, metal 213
Development, product 247
Directories 272
Disintegrators 63
Dicers 63
Drives 243
Fluid 199
Motor 202
Var.-speed 151
Dryers 198
Drying 269
Drums, steel 94
Lithographed 133
Dust control 152
Emulsifiers....37, 222, 265
Fans 188
Feeders 232
Scale 214
Files, card 269
Fillers....60, 61, 114, 123
133, 147, 157, 262
Beans 8
Milk 148
Peas 8
Portable 269
Filteraids 100, 184, 265
Filters 265, 269
Dust 152
Wire 218
Wire-cloth 262
Fittings 154, 269
Flavors 263
Black pepper 248
Butter 254
Cardamom 248
Cassia 248
Chili con carne....259
Clam chowder 264
Garlic 248
Maple 25
Meat 190
Non-caloric 15
Raspberry 169, 219
Sausage 258
Seasonings 245
Soup 266
Spices 269
Sugar 168
Sweeteners 15
Vanilla 211
Vanillin 2
Veg. proteins 257, 267
Foil packaging 266
Formers, carton 128
Gas 16, 269
Generators 259, 262
Gloves 269
Gluers 109, 257
Glycerine 208
Graders 8, 62, 218
Grinders 144
Heat exchangers 30, 111
Heating, air 262
Heat-trans. equip. 36
Hoists 194, 229
Homogenizers 204
Hose, plastic 225
Imprinters...123, 130, 247, 272
Innerwraps, plastic....113, 119
121
Inserter, carton 109
Insulation mtls. 24
Glass 207
Jacketing 28
Jacketing, alum. 28
Kettles 260
Labelers....60, 61, 62, 136
Lubricants 187, 215
Mask, filtered 153
Mast-cylinder, truck 161
Metals
Stainless steel 17, 40
Mills
Cocoa-liquor 146
Ring-roll 144
Mixers....21, 36, 63, 144, 161
178, 204, 250
Meat 151
Monosodium glutamate..106, 258
259, 264, 266
Motors....4, 18, 137, 159, 165
202, 265, 269
Induction 262
Mullers 178
Nameplates 269
Nuts 241
Office machines 269
Overwraps
Aluminum 131
Paper 171
Parchments 166
Plastic....113, 119, 121
Waxed 103
Packaging equip....88, 109, 123
128, 132, 150, 174, 262
Palletizers 109
Pans, shaker 149
Paper 171
Parchment 166
Pasteurizers 86
Pea equipment 8
Peeler, lye 63
Pipe & Tubing....154, 262, 269
Glass 277
Plastic 121, 225
Stainless steel 231
Piston packings 201
Power, elec. 272
Processor, hollow-screw 280
Pulverizers....181, 262
Pumps....154, 247, 261, 262
Rotary 242
Purifiers 193
Recipes 269
Reducers, speed 262
Refrigeration equip....217, 269
Compressors....205, 220, 237
Condensers 205
Coolers, spray 217
Doors, cold-storage 240
Float controls 258
Freeze-drying 269
Laboratory 112
Plate freezers 62, 228
Rivets 241
Rods 269
Rubber parts 265
Salt 39, 189
Depositor, tablet 39
Sanitation 172, 197, 255
Screws 241
Sealers....62, 109, 132, 134
157, 174, 257
Seasonings 245
Seamers 251
Separators 144, 262
Services 272
Sewers, bag. 153
Sheets 269
Sorbitol 191
Spices 269
Sprockets 196, 269
Starch, wheat 256
Starches 96
Steam traps 12, 223
Sterilizers, lamp 167
Straightener, can 60
Strainers....12, 218, 233
Strapping, steel....265
Sugar, liquid 158
Surfacing mtls.
Cement 163, 269, 272
Enamel 265
Film 269
Flooring 269
Floors 132
Paint 265
Sweetener, non-caloric 15
Switch, limit 264
Syrup, corn 203
Tank cars 6
Tanks 234
Cooling 262
Storage 262
Truck 265
Tape 100, 269
Thickening agents 96, 256
Tractors, highway 155
Trailers 163
Trucks
Commercial 192, 249
Dumpers 34
Hand....129, 153, 209, 265
Industrial 148, 265
Mast-cylinder 161
Refrigeration 269
Tanks 265
Tractors 155
Trailers 163
Vacuum equip., jet....250
Valves....20, 145, 154, 226
252, 268, 278
Air 262
Plug 244
Stainless steel 148
V-belts 158, 262
Viners 81
Vitamins 31, 176
Washers 241
Wrappers...123, 126, 150, 174

CIRCLE PAGE NUMBERS HERE, FILL IN OTHER SIDE, AND MAIL

LISTINGS CONTINUED FROM OTHER SIDE

151A Speedrangers GE, GV
151B Meat mixer
151C Flow regulator
152 Dust Bul. 528
153A Mask-filter
153B Sew Model S-3
153C Powerworker 26
154 All items shown
154a Fittings
154b Valves
154c Pumps
154d Tubing
155A Highway tractors
155B Apron conveyors
157A Elec. recorders
157B Exact-O-Fill
157C Tel. conveyor
158 Flo-sweet
159A Motors
159B V-belts
160 Dicalite
161A Scale
161B Blender
161C Truck mast-cylinder
162 Condenser Bul. 5AA
163A Citrus trailers
163B Dual-Paks
163C Resin cement
163D Anco-X
165 Motors
166 Veg. parchment
167 Sterilamps
168 "Zig-Zag" conyr.
169 Raspberry flavor
171 Paper
172 Plant sanitation
173 (ad) Boxes
173A Cap
174 Packaging unit
175a (ad) Tektor indicator
175b (ad) Tektor control
175c (ad) Tektolog recorder
175A Bird carton
175B Carry-home carton
178 Mix-Muller
181 Pulverizers
182 Furnace Bul. 3-2
183 Deaerator Bul. 52-76
184 Celite
185 Carboloy
186 Syphon Cat. EG-D
187 Stanolube HD-M
188 Fan Bul. F-100
189 Pallet conyr.
190 Flavor Cat. C
191 Sorbitol
192 Trucks
193 Purifiers
194 Hoist Bul. 145
195 Zest
196 Taper-Lock
197 All items shown
197a Floor handbook
197b Floor mach.
197c Floor scrubber
197d Vac. cleaner
197e Concrete floors
198 Dryers
199 "Any-Speed" drives
200 Compressors
201a Pumcup Bul. 4502
201b Pumcup Bul. 4401
202a Motors
202b Motordrives
203 Corn syrup
204 "Superhome"
205a Compressors
205b Boosters
205c Condensers
206 Meter Bk. 566-RF
207 All items shown
207a Building insul.
207b Low-temp. insul.
207c Pipe insul.
207d Tank insul.
208 Glycerine
209 Powerworker 26
210 Cotton belting
211 Vanitrope
213 Detector Bul. B-1020-A
214 Scale feeders
215 "Simplify & Save"
216 Brine control
217 Refrigeration Bul. 105
218 All items shown
218a Filter leaves
218b Strainers
218c Sizing screens
219 Raspberry flavor
220 Compressors
222a Antifoam A
222b Antifoam AF Emul.
223a Trap. Bul. 152
223b Belting Bul. 20
224 pH Meter Data 86-13
225 Tygon Bul. T-77R
227 Roll-Free conyrs.
228 Plate freezers
229a Lift About-Jr.
229b Cranes
230 Cleaning Bk. 7709
231 Stainless tubing
232 Velofeeder Data 5302
233a Belt Cat. 5
233b Strainer Bul. S-203
234a Temp. recorders
234b Tanks
235a Cebicure
235b Cebitats
236 Add-a-Unit controller
237a Conveyor belting
237b Compressors
237c Air coolers
238 Thermometer Bul. 51-129
239 Batteries
240 Cold-storage doors
241a Manual P26
241b Conveyor belting
242a Decolorizer
242b Pump Bul. 545E
243 Drives
244 Plug valves
245 Seasonings
247a Coders
247b Imprinters
247c Pumps
247d Product development
248a Nozzle Cats. 6-A, 6-C
248b Spice oils
249 Trucks
250 Jet-vacuum equip.
251 Seamers
252 Multiport valve
253 Water chillers
254 Buttatone
255 Cleaning agents
256 Paygel
257a Vac. pres. chambers
257b Sealer Bul. FE1498
257c HVP
258a Float controls
258b MSG
259a Sno-tex
259b Sani-cleats
259c Generators
259d MSG
260 Agitator kettle
261a Spray nozzle
261b SeaKem
261c Pump
262 (ad) Belting Cat. 3679
262A Tube Cat. SB-49
262B Pulverizer Bul. A, B
262C Gas Bul. 10
262D Motor Bul. 1600
262E Air-handling units
262F Cloth Bul. 531
262G Boiler Bul. EC-1152
262H Tank Bul. MST-50240
262I Packaging mach.
262J Valve Bul. 61861
262K V-belts
262L Separators
262M Reducer Cat. P-53
262N Form EG1153
262O Pump Bul. PM20
262P Filler Bul. 155
263 Bak-O-Flavors
264a Conyr. Bul. FE354
264b Switch Sheet HL-3
264c MSG
265 (ad) Syncrogear
265A Control Bul. 6504
265B Control instruments
265C Moisture Bul. 75
265D Filter system
265E Report TI27-A-16b
265F Meter Lflt. F-951
265G Truck Bul. DM53-3
265H Truck Cat. 10-M
265I Conveyor belting
265J Tank Bul. TT52227
265K Floor enamel
265L Packaging foil
265M Bread emulsifier
265N Rubber parts
265O Paint Bul. DK-1-53
265P Strap SPD92
266a Tenox
266b MSG
267a HVP
267b Press Weld
268 Koncentrick-Fitted valves
269a (ad) Nozzle Cat. 24
269b (ad) EFS-B Filter
269c (ad) Portable filler
269d (ad) Trans. refrigeration
269e (ad) Spices
269f (ad) Catalog A-418
269A Teflon Cat. ETH-2427
269B Labeling tape
269C Folder 290112-47-5M-453
269D Organic chems.
269E Flooring
269F Dessicant
269G Vacuum mach.
269H Safety gloves
269I Bonding cement
269J Pipes, fittings
269K Recipe bk.
269L Motor Bul. 1848
269M Nameplates
269N Gas Cat. 81
269O Freeze-Drying Cat. 735
269P Rotary file
269Q Office machines
269R Microscope
272A Directory
272B Code-Dating Bk. 5M
272C Resistance chart
272D Tech. services
272E Cat. 2-53 (15M) 4900
272F Code Form 2213
272G Chem. Bk. F-6136G
272H Farm chemicals
277 Glass pipe
279 Boxes
280 Hollow-screw processor

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March 1954

of earth particles into the beer. Clarity depends on this and the quality of the earth used. Plate filters are safer to use but more expensive in first cost.

Centrifuges alone do not turn out beer of sufficient clarity and chill-resistance, but are excellent pre-filtration equipment. Mass or sheet filters can produce beer that is highly stable both biologically and chemically. They are expensive to operate, and require skilled labor with considerable knowledge of the beer.

Centrifuges have the highest first cost per bbl. filtered, but their operating costs are the lowest of all clarification methods. Up to twice as much beer can be put through a mass filter before cleaning and repacking the filter becomes necessary, if it is first centrifuged.

Entire output of the Carlsberg brewery is centrifuged in 10 machines operating in parallel. Cost for labor, maintenance and electricity is about 0.7¢ per bbl. In its new filter station and bottle shop, however, centrifuging followed by mass filtration will be practiced as the most economical method for production of the highly stable beers that are now demanded in Denmark.

Digest from "The Filtration of Beer," by Orla Moller (Carlsberg Breweries, Copenhagen, Denmark). *Brygmesteren*, Vol. 10, No. 7, 177-98, 1953. (In Danish.)

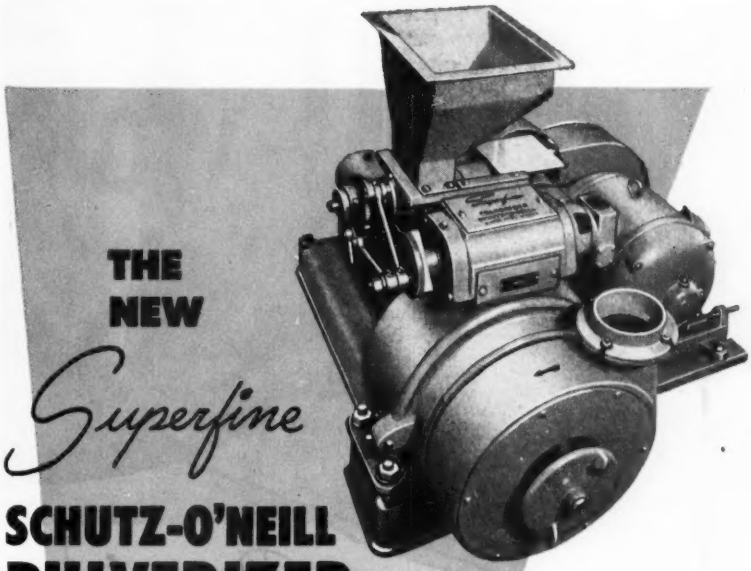
DAIRY

Vegetable Fat Milk Powder

By combining concentrated skim milk and a water-fat emulsion, as revealed in a recent patent, and then spray-drying, a whole milk powder will be obtained with flavor, palability and keeping qualities that are superior to powder produced direct from whole milk.

Skim milk, pH 6.8-7, with fat content of 0.15% or less, is flash-pasteurized for 30 sec. at 165 F. and rapidly cooled. It is then concentrated by vacuum evaporation to 35-55% solids, with temperature maintained well below 150 F. Concentrate is mixed with a special water-fat emulsion separately prepared by combining a suitable fat, such as hydrogenated cottonseed oil, with a solution of sodium caseinate. Proportions may vary from 45-89% water, 10-52% fat, and 1.2-3.1% sodium caseinate. Latter is an excellent emulsifying agent prepared by dissolving edible casein in sodium bicarbonate or carbonate.

Mixture of fat and casein materials is homogenized at 120-150 F. and sterilized at 240-260 deg. for 10-15 min. It is then cooled and added to the skim milk concentrate. Mixture



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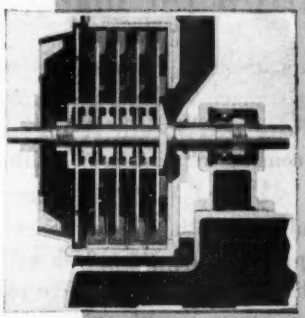

Cross section of the grinding chamber of our "Superfine" Pulverizer showing from left to right the cone plate, perforated mill plate and 4 beater plates with multi-section liner divided by annular rings.

Here is a disassembled mill. Every part separated and accessible—corrugated liners exposed for easy cleaning, exchange or replacement.

AIR FORCE PULVERIZING—AIR CLASSIFICATION

Here is a proven, automatic and dustless method of pulverizing any grindable material to your desired finess. For extremely fine grinding and uniform particle size distribution of product, the principle of centrifugal impact with air attrition utilized so efficiently by the Schutz-O'Neill "Superfine" Pulverizer has never been surpassed. The centrifugal force recirculates coarse particles within the mill for regrinding. The air classification carries the fine particles out of mill as uniform product of the desired particle size.

ADAPTABLE TO THE COMPLETE RANGE OF PULVERIZING FROM COARSE TO ULTRA FINE

The ease of grinding and the versatility of the unit are two features not found in any other pulverizer on the market. With proper adjustments, this mill will produce particles from 40 mesh to low micron sizes under conditions that enable you to accurately control not only particle size but also the size distribution in the product. This can be done while maintaining grinding temperatures below 125-130°F.

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Ten minutes is all you need to take apart a Schutz-O'Neill "Superfine" for cleaning, to adjust for fineness, or replace any part. Remove 2 pins and cone housing lifts off. Loosen 1 set screw and 1 nut and all other parts slide right off the center shaft. It is unmatched for accessibility and simple, rugged design.

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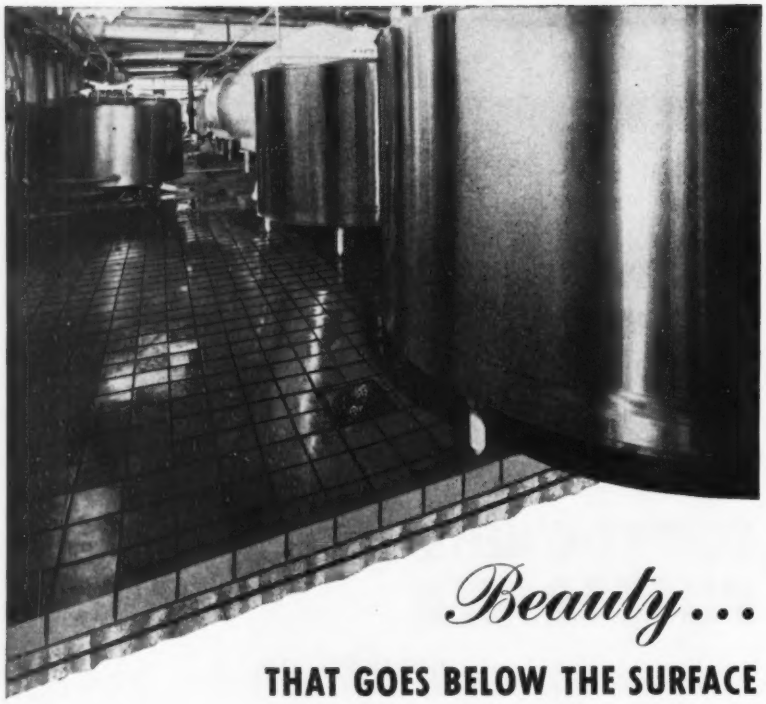

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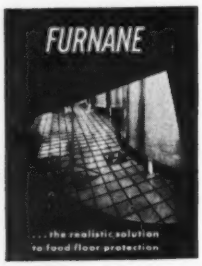


New Booklet Available. Send for Bulletin 3-2.

ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNSYLVANIA
Houston 1, Texas

food floor protection.

® U. S. Pat. Office 553217

forms a homogeneous milk in which the fat globules are thoroughly dispersed. It can then be spray-dried to form a powder that can be packaged and handled in the conventional way. Product is readily reconstituted with water to form a liquid that closely simulates natural whole milk.

Digest from U. S. Patent 2,650,879, issued Sept. 1, 1953, on an application dated Oct. 23, 1950, to D. D. Peebles, Hillsborough, and M. D. Girvin, San Anselmo, Calif., assigned to Western Condensing Co., San Franscisco.

Effect of Mixing Time On Bulk Milk Samples

Agitation of milk in farm bulk holding tanks for 60 sec. provides adequate mixing for butterfat sampling if tanks are constructed according to tentative 3A standards.

This was determined by a study conducted at University of Wisconsin to observe effects of short periods of mixing with variable quantities of milk in farm tanks.

Tests were conducted at the University Farms with a 150 gal, and a 200 gal. tank filled to levels from ¼ to full, and after 2-12 hr. creaming periods. Additional checks were made on 11 tanks under field conditions with creaming times from ¼-3 hr.

In all cases, 60 sec. agitation gave samples that did not vary more than 0.10% from composites (taken at 5 points in tanks after 5 min. agitation) when tested by the Babcock method. In most cases the differences did not exceed 0.05%. Agitation for 90 sec. in field tests gave no significant differences.

Digest from "A Study of the Influence of Agitation on the Babcock Test of Milk Samples From Farm Bulk Holding Tanks," by B. J. Liska and H. E. Calbert, *Journal of Milk & Food Technology*, 14-17, Jan. 1954.

PACKAGING

Protects Labels During Casing

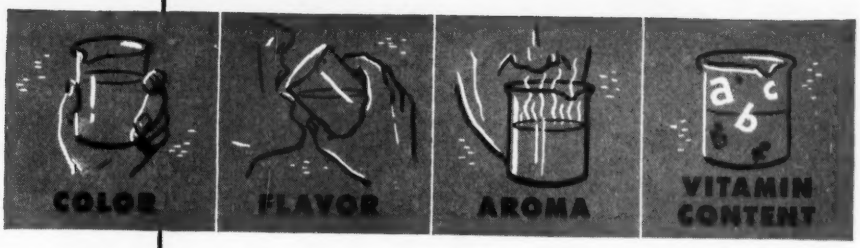
Packaging filled bottles of catsup and vinegar into shipping cartons without damaging the freshly applied labels is the crux of a recent patent.

The machine comprises a table supporting an endless conveyor belt, preferably of herringbone weave wire. Suspended above the belt is a series of 7 lengthwise plates that are given an oscillating movement to facilitate gathering bottles in lines comparable to the number of cells or compartments in the carton. In order to avoid disturbing the labels, these guide plates are cut out at their front ends so that they engage the bottles below and above the labels.

As bottles move along the belt, they

here's how

you can preserve



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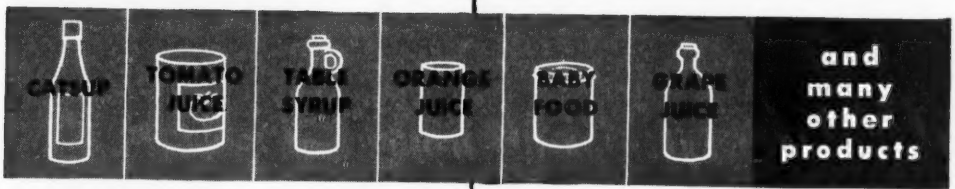

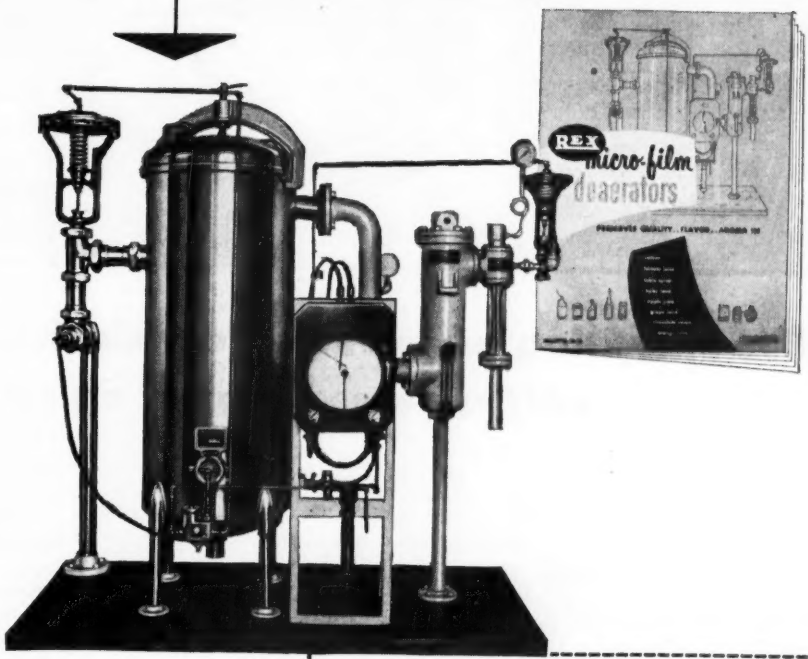

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TO GIVE foods and beverages that extra quality which results in more sales appeal, leading processors depend on Celite* Filtration.

The Celite method is *efficient.* It removes even the finest suspended solids. Moreover, Celite Filtration is *economical.* It may be used with any type of conventional filter, it is almost automatic, and skilled labor is not required for routine operation. And Celite Filtration is *flexible.* To meet your specific requirements, Celite comes in nine standard grades of microscopically controlled particle size. The right balance between degree of clarity and rate of flow may be easily controlled.

To purify water in large volume—to achieve brilliant clarity in many food products such as sugar, syrups, wine, beer, vegetable oils, cooking fats—to remove many colloidal impurities which may affect product quality . . . Celite Filtration offers unexcelled results.

A Johns-Manville Celite Filtration Engineer will gladly discuss the advantages and use of Celite in your product or production process. For his services, without obligation, write Johns-Manville, Box 60, New York 16, N. Y. In Canada, 199 Bay St., Toronto 1, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

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are automatically spaced and formed into groups of a number corresponding to cells in the carton, then deposited on a tilting table. Operator inverts a carton over the group, pushes it into position and trips the table. Filled carton is then dumped upside down onto a conveyor belt and carried to a station where the bottom is glued. Operation is continuous and one operator can package catsup at the rate of 600 bottles per min.

Digest from U. S. Patent 2,657,845, issued Nov. 3, 1953, on an application dated Aug. 1, 1951, to R. A. Smith, assigned to H. J. Heinz Co., Pittsburgh.

Taste Thermometer

—*Continued from page 43*

ally presents, for the first time, an orderly gustometric analysis of the whole field of dehydrated and concentrated foods, as well as means of formula analysis.

For example, dilutions below the origin of 100 parts can serve as measureable degrees in working out dry mixes and recipes. And between the concentrated foods and dilution series, an entire range of reconstituted dehydrated foods can be marked off for gustometric response on the same scaling device.

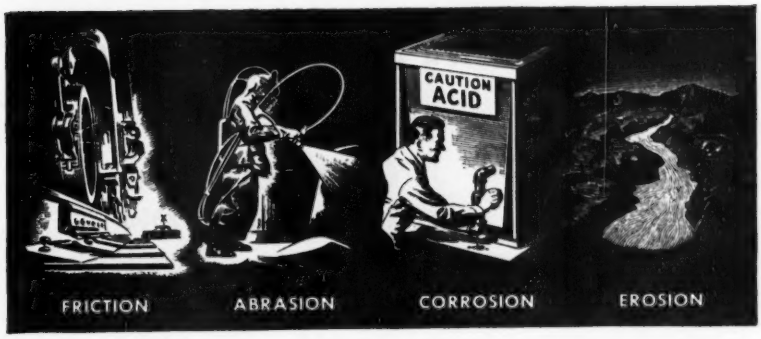
Hence, by the above scheme many major unit operations of food engineering—dehydration, processing, concentrating, diluting, formulating, etc. —can be gaged by the same measuring device.

How is this of practical value to the processor? Well, consider the elusive, but all-important, quality of sweetness in concentrated orange juice. Gustometric analysis will establish concentration to proper D-value rather than by an inferential Brix, and will thus directly hit home to the consumer.

What about the taste imparted to prepared mix by shortening? Here is a scale that not only will pinpoint a proper balance between taste and baking quality in shortening formulation but also indicate the best unit operation for incorporating this ingredient in the mix.

However, aside from use as a direct "slide rule" in solving processing problems, the gustometric scale provides an ironclad means for checking and specifying procedure to assure uniform end-results in day-to-day operations.

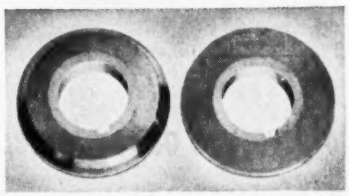
Further, it can act as an inviolable means to meet regional market preferences. Sweetness or blandness can be "built-into" a product according to an exactly determined numerical value. A protein concentrate beverage going to a semi-tropical area, for instance,



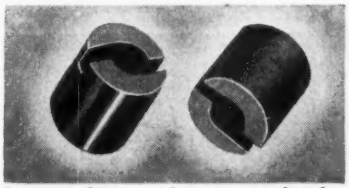
In the processing industries...

REDUCE COSTLY WEAR

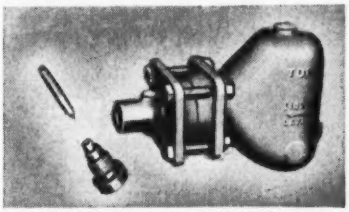
with Carboloy® cemented carbides



Dies for the extrusion or pill pressing of highly abrasive ceramics, pharmaceuticals or powdered metals, equipped with Carboloy cemented carbide, remained on the job many times longer than any other material.



In one plant, steel spray nozzles for homogenizing and dehydrating food products lasted 100 hours, due to the corrosive-abrasive action of the food products. Then Carboloy cemented carbide nozzles were used, and nozzle life increased to 3000 hours.



Steel valve stems and seats in a refrigerator regulating valve were quickly corroded and worn by ammonia. To resist this, inserts of Carboloy cemented carbide were substituted. Valve life increased 5 to 6 times.

WHERE ACIDS, alkalis, heat, oxidation and the like reduce equipment life, you can slow down wear, reduce maintenance costs, increase production and improve product quality with Carboloy cemented carbides.

The Carboloy organization manufactures cemented carbides in standard stock items, or designs them to your specifications for spray nozzles, steam valves and orifices for processing foods, soaps and drugs. Plus countless other applications such as core pins for ceramic baking where friction, corrosion, erosion and abrasion must be resisted.

Ask your equipment manufacturer, or write us, about strategic parts made wear-resistant through use of Carboloy cemented carbides.

Put These Outstanding Characteristics To Work In *Your* Plant:

- High abrasion resistance
- High corrosion resistance
- High erosion resistance
- High heat resistance
- High impact strength
- High friction-wear resistance
- Nonmagnetic
- Light weight (where desired)

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could be corrected to the sweetness level of fresh milk or, perhaps, grape juice.

Gustometric measure of taste level could also be very helpful in setting up more workable Food & Drug standards. Tartness or sweetness of applesauce, for example, could be established as a taste level and expressed in D-units on the label. Similar evaluation could be made for sweet and sour pickles, various canned fruits, etc.

Focusing Agent

However, while the gustometric scale does offer boundless opportunity in developing and improving foods, its fundamental value to the food manufacturer, of course, still lies in its use as a true focus on the taste expectations of the consumer.

Despite marked progress in psychometrics, there is still great reluctance among food engineers to rely on such "variable human response" as a positive arbiter in production control. Rather, there has been a strong trend to develop and accept straight instrument techniques to measure and control a hypothetical desirability.

But it is difficult to foresee instruments that can measure the subtleties of sweetness, sourness, bitterness, and salinity in various foods of the day. Yet there is no doubt that these measurements represent actual taste levels needed for authentic quality control.

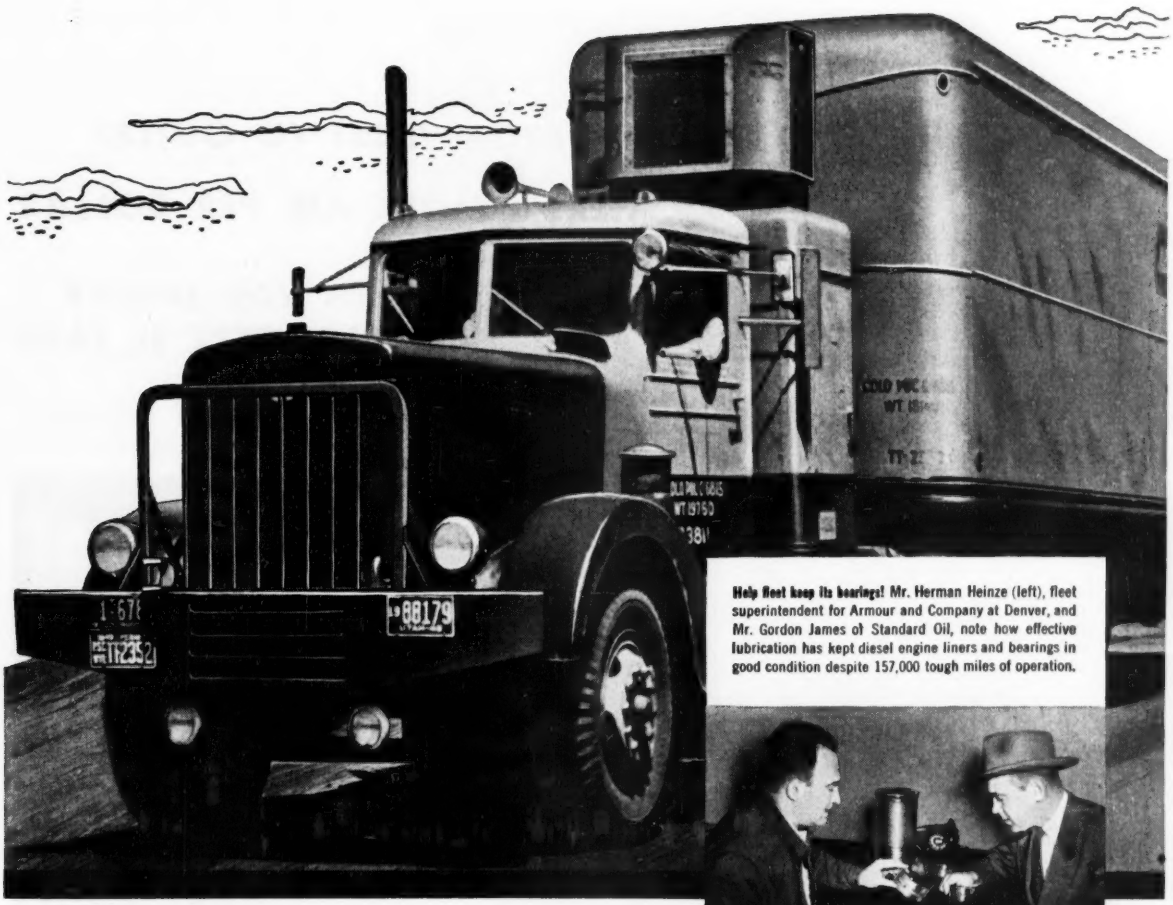
With the gustometric scale as a universal standard of reference, potent meaning can be drawn from subjective human testing, and acceptability of product can be brought—possibly by statistical techniques—within range of prediction and actual dynamic control.

In other words, a transposition of subjective taste response into standard D-unit values will provide a heretofore unavailable, positive framework for process control instrumentation.

It should be noted that the universality that Dr. Dove has built into his scale enhances its prospect for use in this broad manner. Like many modern instruments, he sought for a wide usage range—like a recent industrial refractometer that possesses seven interchangeable scales to adjust to a wide group of products.

So, too, the gustometric scale is adjustable to focus on at least three areas of industrial and scientific usage with its macro, micro, and ultramicro subdivisions.

Of course, years of work lie ahead in adopting the new technique. But it is firmly believed by Dr. Dove that, in time, each tasteable substance or item and each problem in gustatory response of individuals or groups of consumers will eventually be oriented



Help fleet keep its bearings! Mr. Herman Heinze (left), fleet superintendent for Armour and Company at Denver, and Mr. Gordon James of Standard Oil, note how effective lubrication has kept diesel engine liners and bearings in good condition despite 157,000 tough miles of operation.

Stretches mileage between overhauls on tough mountain run with . . .

● The big diesel unit shown above is one of a mountain-climbing fleet of trucks operated out of Denver, Colorado, by Armour and Company. Lubricated by STANOLUBE HD-M Motor Oil, it was recently taken in for overhaul after operating 157,000 miles over steep grades and under extreme weather and temperature conditions.

The liners had less than .005 inch wear and showed no signs of scoring. They were reinstalled for further service. There was very little bearing wear and no pitting. Rings were free. The engine, overall, was clean and in good condition.

Throughout the Midwest, in a wide variety of service, STANOLUBE HD-M has proved its ability to reduce fleet maintenance and improve operating efficiency.

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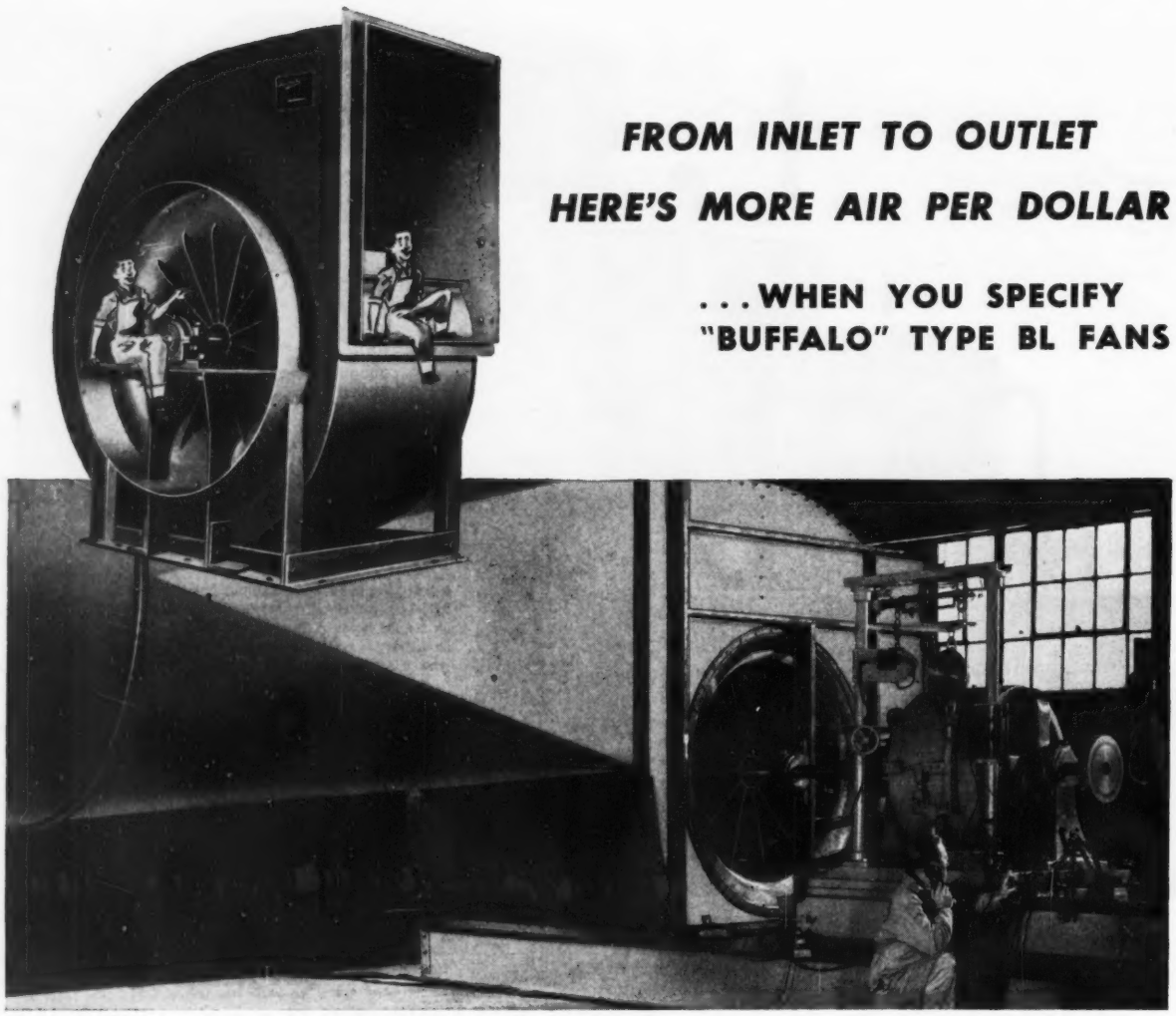

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Even before incoming air reaches the wheel of the "Buffalo" BL Fan, it is guided in the most efficient path. The inlet bell is smoothly curved for absolute minimum friction; while the welded-on stationary inlet vanes reduce turbulance and assure rated air delivery even if inlet conditions are unfavorable. The "Buffalo" inlet is one reason why "Buffalo" air-moving costs are low.

The new improved "Buffalo" rotor, too, vitally affects performance. Here the full-curvature die-formed shroud and the backward curved blades move the air through the specially shaped housing and outlet with smoothness, quietness and efficiency. In addition, the fan's performance is stable from shut-off to free air delivery.

Besides these and other features, there is an intangible in all "Buffalo" fans that has always made for high satisfaction. We call it the "Q" factor, or built-in quality which provides long life and freedom from trouble. This is the sum total of the 77 years of "Buffalo" experience and know-how that goes into every fan to leave our plant.

For further details on "Buffalo" Type BL Fans, write for new Engineering Bulletin F-100

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into focus within defined areas of the Master Scale and on one or more of its subscales.*

It is to be noted that Dr. Dove also holds a position with the Illinois State Department of Health, which is supporting his studies in the further application of these techniques to therapeutic foods and hospital feeding.

*Readers interested in a more technical presentation on this work are referred to "A Universal Gustometric Scale in D-Units", *Food Research*, 1953. Vol. 18, No. 5, P. 427-483.

End (*Resume reading on page 44*)

Suggestion System

—*Continued from page 51*

1. Suggestion boxes are located where the greatest number of employees pass most often.

2. Promotion posters on the bulletin boards above boxes are changed regularly. They often capitalize on seasonally popular items to stimulate idea contributions.

3. Names of those whose suggestions have been accepted are posted—both at the boxes and in the company's house organ. However, in no case is the suggester's idea revealed nor the amount of the award.

4. Whenever possible, enclosures promoting suggestions are included in the various communications to employees.

5. Periodically a suggestion booth is set up in all plants. In attendance is a competent individual to aid employees in filling out suggestion blanks —to clarify ideas and aid in writing them, so as to portray accurately the meaning and value.

6. Personal contacts are made in plants by members of the Suggestion Committee and by individuals of all supervisory groups to encourage workers to think in terms of better ways and means and then submit ideas.

How Valuable Are Suggestions?

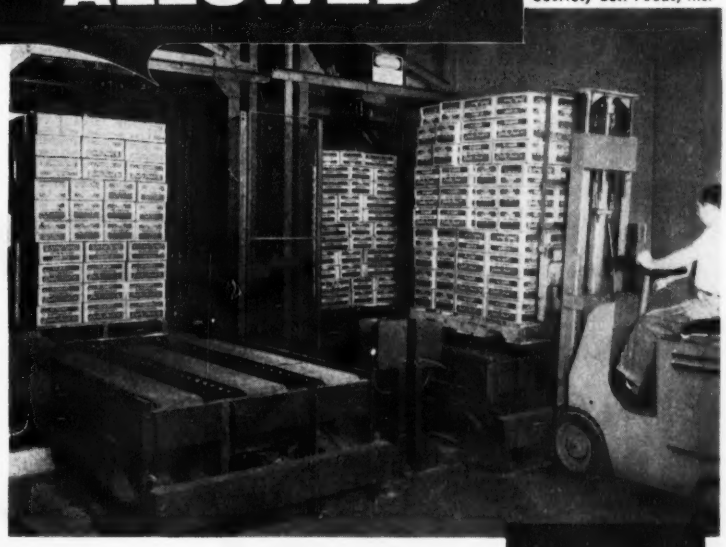
If a machine tender or manual worker in your plant came up with an idea that meant a saving to your company of more than $25,000 the first year, how welcome would it be?

National Biscuit Co. has actually "cashed in" on an idea of that magnitude. Submitted by one of the company's employees, it was awarded the $2,500 maximum.

Among the 7,955 suggestions submitted in 1947, the year the system was inaugurated, 575 were considered worthy. They were paid for in awards totaling $12,000. Last year, 9,540 suggestions were processed, 1,508 were adopted, and $25,000 was paid out.

NO PASSENGERS ALLOWED

Courtesy Best Foods, Inc.



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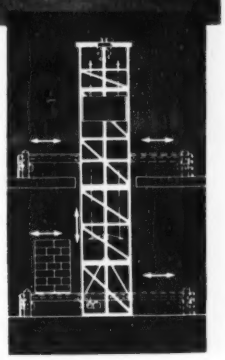
Where pallet loads are to be transferred from one level to another, this type of conveyor accomplishes the raising or lowering quickly, safely and automatically. The carrier and stations at all levels are equipped with reversible power units for loading or discharging the pay-load.



At Alvey, every conveyor problem is special. Every system is exactly tailored to your particular needs . . . designed by the conveyor industry's top engineers to reduce costs and speed product handling.

An Alvey Engineer is always available. He will visit your plant and evaluate your problem. Write for appointment.

Every time you **MAN**handle a package, you add to the cost and nothing to the value; therefore, put your packages on Alvey Conveyors that are engineered to fit your individual requirements.

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From a cold dollars-&-cents standpoint, the system has been most profitable. The intangible values, though more difficult to calculate, no doubt represent an even greater gain for the organization. Employee faith in company fairness and integrity can scarcely be measured by a monetary yardstick. Neither can diminished accidents, higher employee morale, and betterment in internal communications.

Plan for Small Plants

A suggestion system for a small size plant can be as beneficial, in direct proportion, as one in a large multi-unit company. Many of the steps should be taken in the same sequence.

It must be assumed that the plan has the support of top management and that because of such support supervisory personnel will grasp quickly its particular responsibility in the plan.

First step is to make a study of successfully operated methods in plants of similar size and also those of greater magnitude. Consider carefully the type best suited to your particular single-plant operation.

Should it be run on the full-identification plan, the partial identification system (suggester known to committee or secretary only), or should it be an anonymous system? Top management is best qualified to make the decision. However, it should be pointed out that most present systems are of the identification type. This helps in maintaining good personnel relations.

Whatever the system, it should not be intricate. Good judgment and common sense have no substitutes. Also, the plan should be fully assembled. If a booklet is to be distributed to employees, it should contain all necessary information. Possibly enough facts on policy and procedure can be included on the suggestion form.

In the system and/or form all of the following points should be covered:

1. Definition of "suggestion"
2. Eligibility of suggestion
3. Eligibility of the suggester
4. Ineligible suggesters and suggestions
5. How to submit an idea
6. Priority of ideas
7. Clear statements of size of minimum and maximum awards
8. What is meant by tangible and intangible suggestions, with emphasis on value of each
9. Procedure followed in determining size of award for both types of suggestions
10. Life or limitations of a suggestion
11. How and when awards will be paid
12. Split-cash awards and circum-

Sorbitol is a naturally occurring, nutritive ingredient of many edible fruits and berries. Produced commercially by Atlas, it is made from corn, cane or beet sugars by hydrogenation.

Food technologists have found that sorbitol imparts improved qualities to many food products, through its ability to improve storage life by stabilizing moisture and retaining softness. Sorbitol is nutritive, and its non-volatility and mild, sweet flavor also contribute to its preference for such use.

Two forms are available: SORBO® (70% solution) and crystalline powder or pellets. Write to Atlas for samples and for technical assistance in application in your own food product.

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Time and money are the two most important factors in any trucking job—and the new Chevrolet trucks for '54 are built to save more of *both!*

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Whether you deliver door-to-door or haul state-to-state, new Chevrolet trucks will speed up your schedules. They bring you new hour-saving engine power—greatly increased acceleration and hill-climbing ability. You save time with greater safety . . . and *without* increasing your maximum road speeds. In traffic or on delivery routes, new truck Hydra-Matic transmission* saves time, and saves driving effort as well. It's the last word in no-shift truck driving.

THEY SAVE YOU MONEY IN *EVERY* WAY

Along with increased power, these great new trucks bring you increased operating economy. You enjoy hefty gasoline savings in every model, thanks to new high-compression performance. In addition, you save on upkeep and maintenance. That's because you get extra strength and stamina in drive line and chassis. There are heavier axle shafts in 2-ton models, newly designed clutches and stronger frames in all models.

See your Chevrolet dealer for all the facts about the "savingest" Chevrolet Advance-Design trucks ever built! . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

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CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

THREE GREAT ENGINES—The new "Jobmaster 261" engine* for extra heavy hauling. The "Thriftmaster 235" or "Loadmaster 235" for light-, medium- and heavy-duty hauling. **NEW TRUCK HYDRA-MATIC TRANSMISSION***—offered on ½-, ¾- and 1-ton models. Heavy-Duty **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **DIAPHRAGM SPRING CLUTCH**—improved-action engagement. **HYPOID REAR AXLE**—for longer life on all models. **TORQUE-ACTION BRAKES**—on all wheels on light- and medium-duty models. **TWIN-ACTION REAR WHEEL BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—greater holding ability on heavy-duty models. **NEW RIDE CONTROL SEAT***—eliminates backrubbing. **NEW, LARGER UNIT-DESIGNED PICKUP AND PLATFORM STAKE BODIES**—give increased load space. **COMFORTMASTER CAB**—offers greater comfort, convenience and safety. **PANORAMIC WINDSHIELD**—for increased driver vision. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—easier, safer handling. **ADVANCE-DESIGN STYLING**—rugged, handsome appearance.

**Optional at extra cost. Ride Control Seat is available on all cab models, "Jobmaster 261" engine on 2-ton models, truck Hydra-Matic transmission on ½-, ¾- and 1-ton models.*

stances governing their settlement.

13. Whether ex-employees are entitled to make suggestions and collect awards

14. Tax deductions and also patent rights

15. What happens when a suggestion is not adopted

16. Any other information specific to your plant or particular circumstances

Don't Start Half-Cocked

Have ready, at the time the system goes into effect, adequate bulletin boards and suggestion boxes. These should be located at points of highest employee traffic.

Clerical forms are absolutely necessary. However, don't prepare any more or less than absolutely required. Through use of these forms you can establish a method covering registration, checking for duplication, and progress reports. Be sure to set up all clerical mechanics in advance (see panel showing forms).

Introduce the system to all supervisory personnel before its inauguration. Impress upon these supervisors the benefits of the system to them. Have a definite understanding as to their responsibility in executing and promoting the program. Origination of ideas and employee cooperation (with or without a suggestion system) are two essentials to any company's success. A well-planned and operated suggestion program makes it easier to get both.

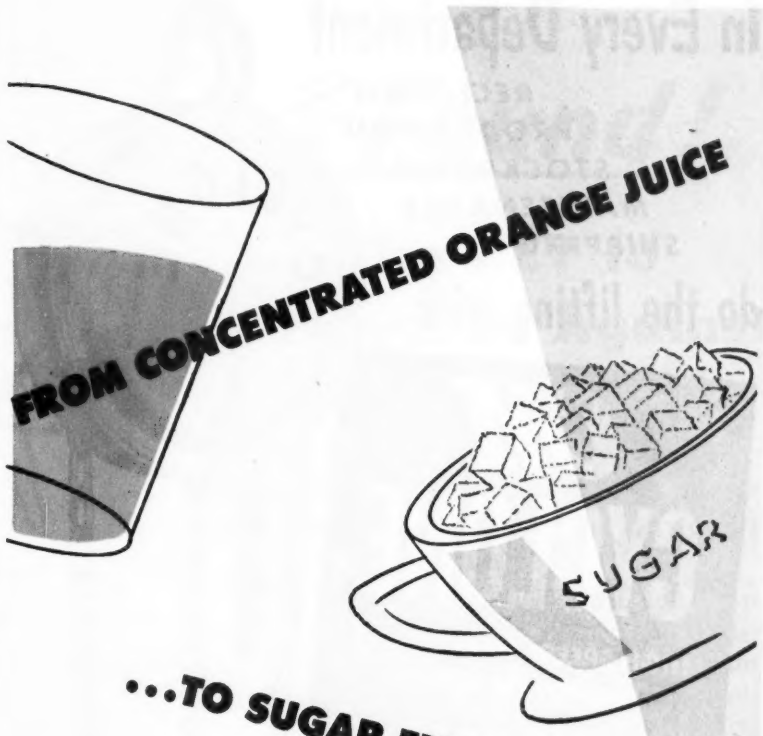
Of vital concern to the company is the method employed for stimulating employee suggestions. If the system is to succeed, the administrator should be a responsible executive. He should be an "all around" man whose guidance is respected by all levels of management.

Promotion of the system is a management responsibility as a part of the never-ending search for more efficient and more productive methods. The administrator should spear-head this promotion. But the follow-up must be shouldered all along the line by management.

Properly conceived and administrated, a system should help develop confidence on the part of the employees. It should aid in developing the feeling of "belonging to the company". Fairly planned and sincerely executed suggestion systems have been of great benefit to both employees and companies because through them people are recognized as people.

But remember, thoroughness and promptness in processing all suggestions received are vital factors in building success.

End (Resume reading on page 51)



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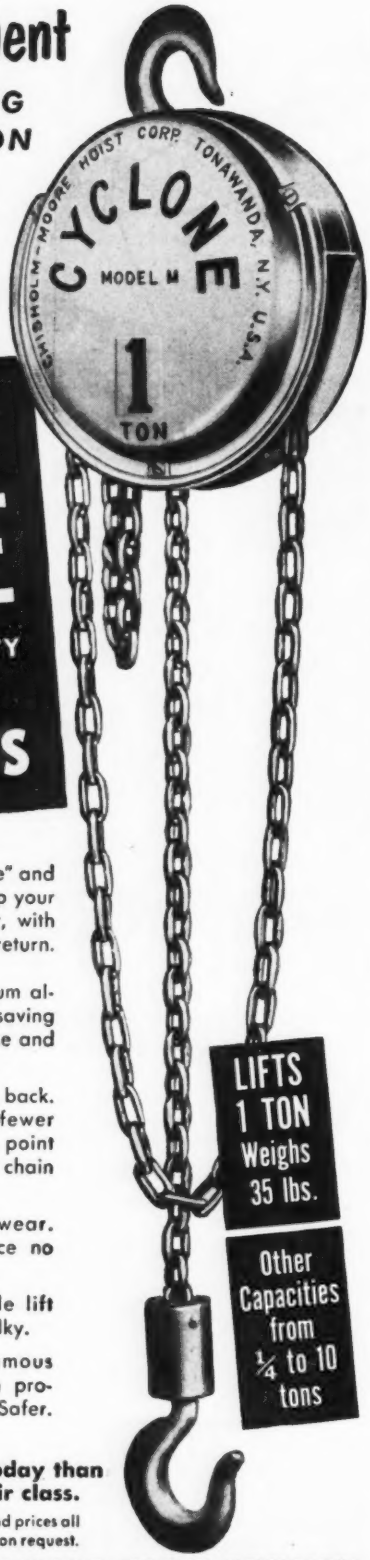

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BULLETIN No. 145 illustrates, describes and prices all CYCLONE Chain Hoist models. Copy sent on request.

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Questions & Answers

THIS MONTH'S PROBLEM

Bubbles in Sandwich Spread

Question—We've been attempting to vacuum-process sandwich spread on a pilot-plant scale with the object of extending product-shelf life. Finished product, however, is objectionable inasmuch as it contains a lot of air bubbles. Do you have any suggestions as to the cause of these bubbles and how they can be prevented? For your information, here are the steps to our process: (1) Vinegar, salt, mustard powder, and egg yolks are mixed in the regular way—without vacuum. (2) Salad oil is introduced and mixed with the batch under 10 in. of vacuum. (3) The batch is then mixed under 25 in. of vacuum to produce a mayonnaise that is free of bubbles. (4) To two parts of mayonnaise, one part of vegetable relish is added, and the batch is mixed under 25 in. of vacuum.

JANUARY PROBLEM

Preventing Bottle Breakage

The Question Was—What can you suggest doing to prevent breakage of bottles traveling on a fast conveyor and then being brought to an abrupt stop—as at the infeed to a filling machine?

Answer—Try cushioning the metal stop with sponge rubber. If this is not completely effective, you will probably be surprised at how helpful it will be to lubricate the bottle-conveyor surface with a little liquid soap. A small, gravity-type liquid soap dispenser will do the job. By reducing friction on

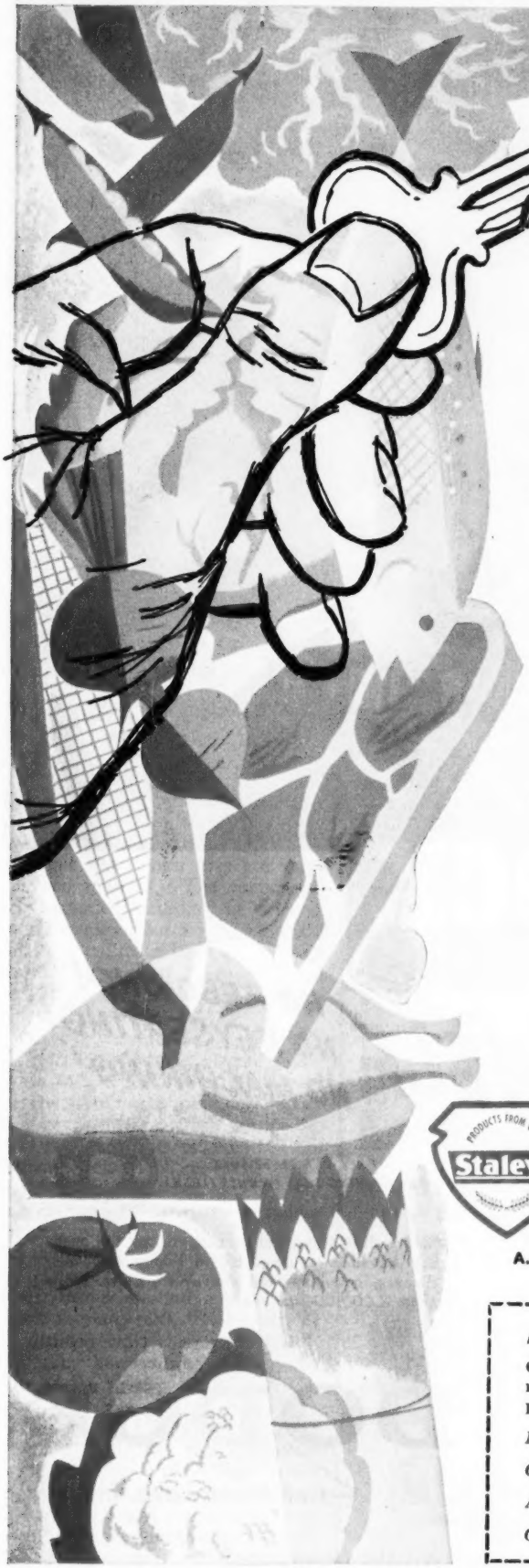
How Would *You* Do It?

Readers are invited to submit to FOOD ENGINEERING answers to questions to "This Month's Problem." Selected answers will be published with credit (unless you specify otherwise). We pay space rates.

What is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers, Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.



Found!

The KEY to Protection Against Flavor Fading!

Amazing ZEST Locks-In Fresh Flavor . . . Your Processed Foods Taste Better . . . Sell Faster!

Yes! Now you can do something to *stop Flavor-Fading* in your processed foods. ZEST, Staley's 99+% Pure Monosodium Glutamate, fortifies and enhances natural, fresh flavors to the point where heat, pressure, or other processing conditions do not rob you of your prime sales appeal—better taste. ZEST adds no flavor, color, or aroma of its own . . . it only brings out and magnifies those desirable flavors already present. Low cost ZEST is easy to use, and requires no formula changes . . . you just add it like salt. And as little as .05% by weight works flavor miracles, the like of which you have never tasted. So stop letting flavor-fading cut into your profits. Mail the coupon below today for the full story on ZEST, and see for yourself how this amazing seasoning can help you to more profits through greater taste appeal.

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Taper-Lock Sprockets are available from Distributors' stocks in a complete range of B-type steel sprockets—1/2" to 1 1/4" pitch. Dodge quality Roller Chain is packaged in 10-foot lengths—also available in 50-foot and 100-foot reels. Save time—save money—keep production rolling—get Dodge Taper-Lock Sprockets and Roller Chain from your Dodge Distributor.

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Standardize, economize with Taper-Lock, the bushing that is interchangeable in Dodge sprockets; sheaves, couplings and conveyor pulleys. *More than 2,000,000 in use!*

DODGE

of Mishawaka, Ind.

the bottom of bottles, pressure on the containers is also cut down.—*The Editors.*

Another Answer

"If a rotary filler is employed, the conveyor should be timed with the intake to the filter.

"However, if a straightline filler is used—one in which several jars are taken at a time from a conveyor—easiest solution is to switch to a flexible plate-type conveyor or one providing least resistance to bottom of jars. The jars then automatically space themselves after each stop. In this way, jars separate after next stop, and jolting is considerably reduced.

"This separation occurs because inertia of the mass of jars is greater than that of jars at the head of the line of travel. Consequently, the first jar gets a head start of inches over the next in line as the leading jars progressively separate from the mass."
—*A. Bruce Durkee, Durkee-Mower, Inc., East Lynn, Mass.*

Horse-Radish Mustard

Question—Can you tell us how to make a horse-radish mustard using our Jayhawk mill?

Answer—There are at least three ways to prepare a horse-radish mustard. The first is to add a quantity of grated horse-radish which has been seasoned with salt and vinegar to a previously prepared mustard. The proportions can be varied according to tastes of your customers, but a good ratio is 1 gal. horse-radish to 10-15 gal. of mustard. This product, however, is not very stable, and it must be promptly consumed.

A second method is to add about 1 percent dehydrated, ground horse-radish to a regular batch of mustard ingredients prior to grinding. While this type of horse-radish carries desired flavor, finished product will not contain specks which are characteristic of this type of mustard.

A third method is to introduce coarsely ground horse-radish root to the mustard ingredients before grinding. A basic formula of this type comprises: Brown mustard seed, 67½ lb.; yellow mustard seed, 94 lb.; salt, 31 lb.; distilled white vinegar (40 grain), 100 gal.; horse-radish root, 2 lb.; clove, 2 lb.; allspice, 1¼ lb.; and cayenne pepper, 1¼ lb.

In discussing formulas, however, it is well to point out that differences in the composition of seeds of various origins and crop years may make it necessary to depart considerably from indicated proportions in order to maintain product quality and uniformity.

Whether you have a new concrete floor or are refinishing an old one, the Multi-Clean Method is fast and economical. It fortifies concrete against abrasion and the devastating effects of excessive water, grease, oils, alkali, soaps and other chemicals. It prevents concrete dusting, pitting and chipping . . . gives you a hardened, completely sealed floor in a wide range of permanent non-fading colors and natural. You'll get better service and greater safety with added beauty and longer life from your concrete flooring when you use The Multi-Clean Method.

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In milling horse-radish mustard in your Jayhawk unit, we suggest that you maintain a uniform rate of feed. Moreover, the rate of feed must be pre-set so that the milling temperature does not exceed 165 deg. F. It is also helpful to keep a log of the number of gallons milled as a guide to frequency of stone dressings.

Checking Uncapped Bottles

Question — On our liquid-filling line, an uncapped bottle sometimes gets through undetected. Spillage results and a shipping case is ruined. Can you suggest some reliable means of detecting uncapped bottles in time to prevent such losses?

Answer—This problem might be approached in at least two different ways—by using some sort of a feeler connected to a microswitch or a photo-electric scanner sighted on the cap.

The first method may or may not be feasible in your case, depending upon size of the cap. The principle involves continuous contact of a cap by the feeler, which does not move far enough to make a circuit through a microswitch (or break the circuit, if preferred). If, however, a cap were missing, the feeler motion would be great enough to make a circuit, which then sounds a warning bell or operates a deflecting gate.

If a photo-electric scanner were employed, light beam would be reflected from a capped bottle but not from an uncapped one.

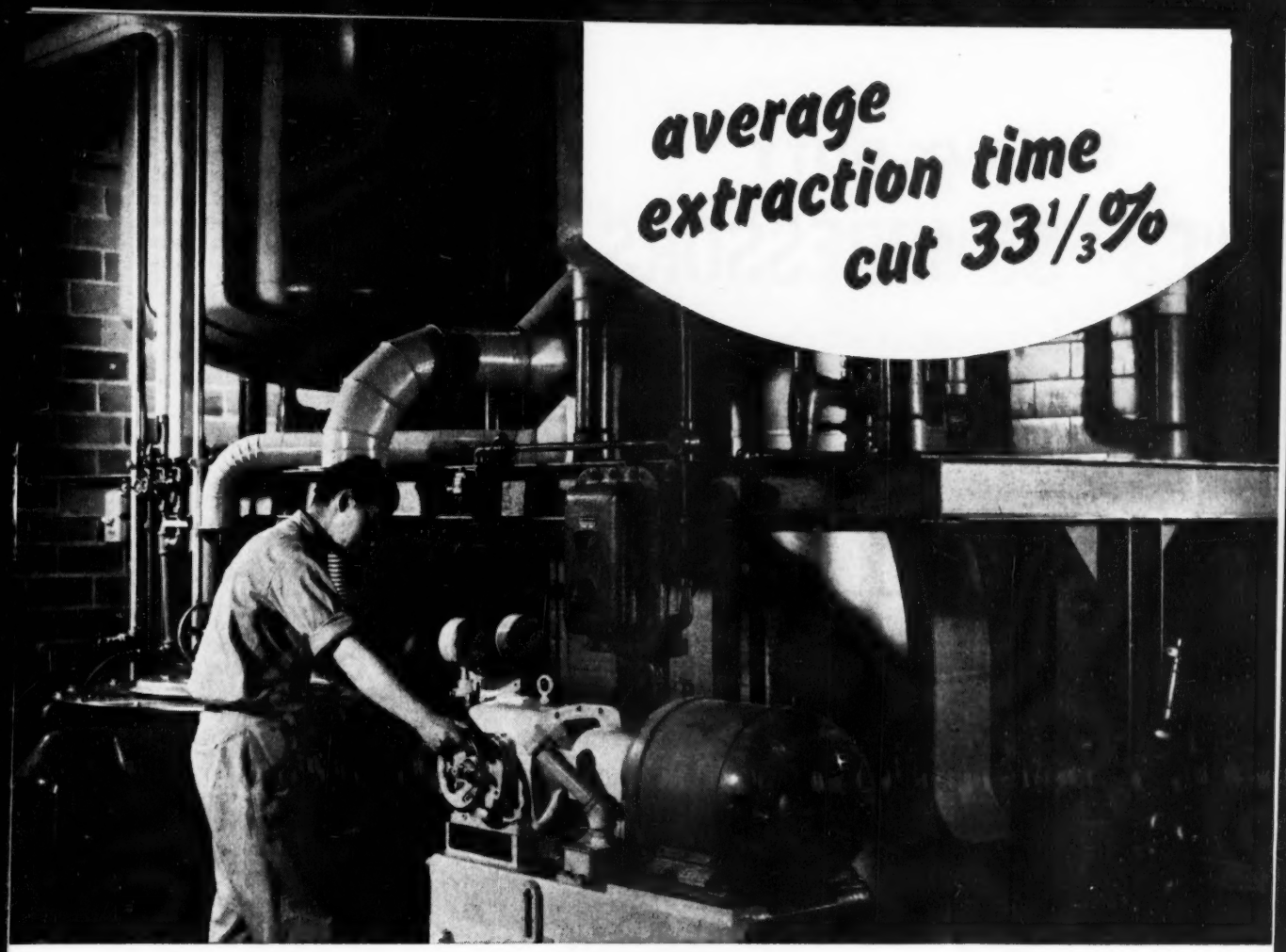
For reliable operation, it is likely that either of these controls would have to be coordinated with another in series—the latter set up to detect passage of bottles, as by microswitch contact or interruption of a light beam

---

Q.—Can you tell us why we encounter foaming in our peanut-frying kettles?

A.—You are either overloading the frying kettle or using mixtures of coconut and other types of frying fats and oils. We've been told that as little as 10 percent coconut oil in cottonseed or peanut oils, or even 10 percent cottonseed or peanut oils in coconut oil, will produce excessive foaming.

Scorching oil at temperatures above 400 deg. F. will cause it to breakdown and thus bring about foaming. Cleaning the fryer is also important in preventing foam and prolonging the frying-life of oil. And don't overlook the possibility of holding oil for long periods at frying temperatures without actually frying nuts.



Once more the ANY-SPEED Oilgear Drive betters machine performance "painlessly"

Many times in our experience the performance of an already highly efficient machine has been bettered without redesign, solely by changing the drive. One case out of many *varied* cases, is the Tolhurst Centrifugal pictured above, located in a great pharmaceutical house. This centrifugal was originally equipped with a two-speed electric motor drive. However the chemicals it is called upon to handle have widely varying crystal packing characteristics. Some of these crystals packed so densely at the speed available, extraction was inhibited, extraction time far out of balance and crystal removal difficult.

A change was made to an *"ANY-SPEED"* Oilgear Fluid Power Drive. Now the operator is able to shade the speed of the centrifuge experimentally—*and easily discover* the *best* speed for each batch of crystals.

As a result, extracting that used to take from 6 to 9 hours was cut to 4 to 6 hours. The extremely slow speed also available made unloading a great deal easier. This user now has several other Oilgear drives including one on a laboratory centrifuge.

There is very often a direct efficiency coefficient between machine operating speed and the type of work being handled. And we can cite many widely varying instances where equally dramatic and profitable gains resulted at once from a simple change to *"ANY-SPEED"* Oilgear Fluid Power Drives. If you want some interesting factual data on Oilgear's steplessly variable speed drives, their outstanding responsiveness to control impulses, their smooth acceleration and deceleration, talk to an Oilgear Engineering Representative. His mature and sound engineering recommendations may profit you greatly. THE OILGEAR COMPANY, 1580 W. Pierce St., Milwaukee 4, Wisconsin.

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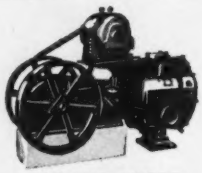
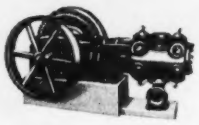
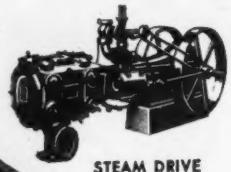
. . . with unusual flexibility of drive and cylinder arrangements



OVERHEAD MOTOR

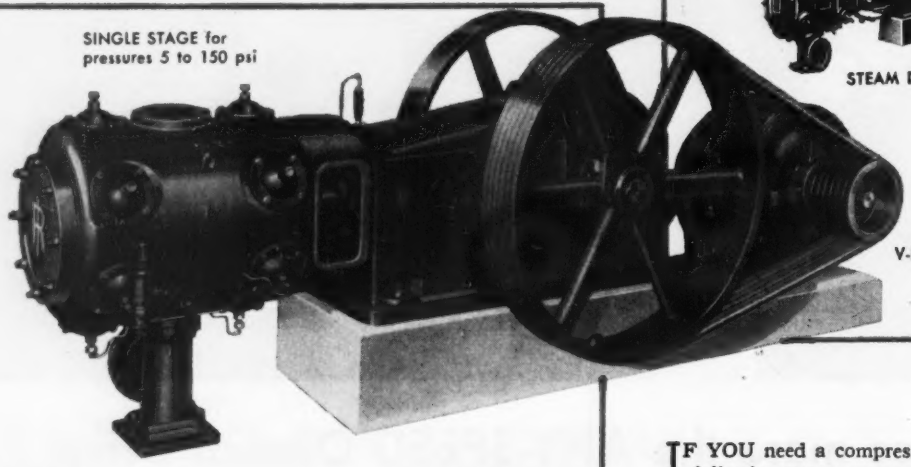


DIRECT-CONNECTED SYNCHRONOUS MOTOR

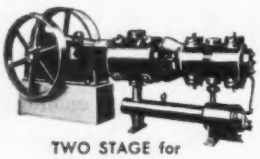


STEAM DRIVE

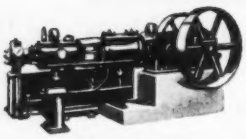
SINGLE STAGE for pressures 5 to 150 psi



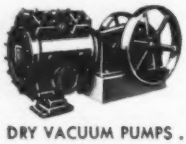
V-BELT DRIVE



TWO STAGE for 150 to 500 psi



THREE STAGE for 500 to 2500 psi



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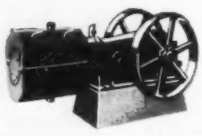
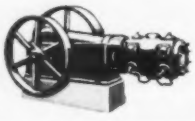
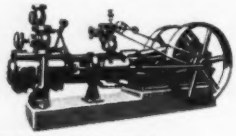


STEAM-PRESSURE BOOSTERS



NON-LUBRICATED CYLINDERS for oil-free air or gas



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- To compress air or gas to any pressures between 5 and 2500 psi, or for pulling vacuums. (Stock cylinders are normally available for all frame sizes, see illustrations.)
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- For handling poisonous, inflammable, or other gases where leakage must be avoided.
- Where compressed air or gases must be free of all traces of oil. (Type NL cylinders require no oil, glycerine, grease or water for lubrication.)
- Where a future change in pressure conditions may call for a change in cylinder sizes.
- Where power cost is an important factor.
- To act as an economical standby unit for larger compressors whose full capacity is not required at all times.

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to another photocell. Otherwise, the indicator would show the presence of an uncapped bottle upon interruption of the normal container flow along the line for any reason.

We understand that this combination of the two controls has been successfully used commercially. It is, in fact, sufficiently flexible so that it can be hooked up with relays, which would give the alarm for one uncapped container but shut down the line if there were two in succession.

Making Chicken Rice Soup

Question—How can I go about manufacturing canned chicken soup with rice?

Answer—Making chicken soup with rice is a two-step operation involving the preparation of soup stock and then the soup.

To prepare the stock: Cook in a steam-jacketed kettle, 50 lb. of chicken in 275 lb. of water until the meat readily strips off the bones. After removing meat, return bones to soup stock and boil an additional 2 to 2½ hr. Then strain soup stock.

The meat can either be canned or used to make chicken ala king, frozen chicken pies, or potted chicken. Or, you might want to add a small amount of diced chicken meat into each can of soup.

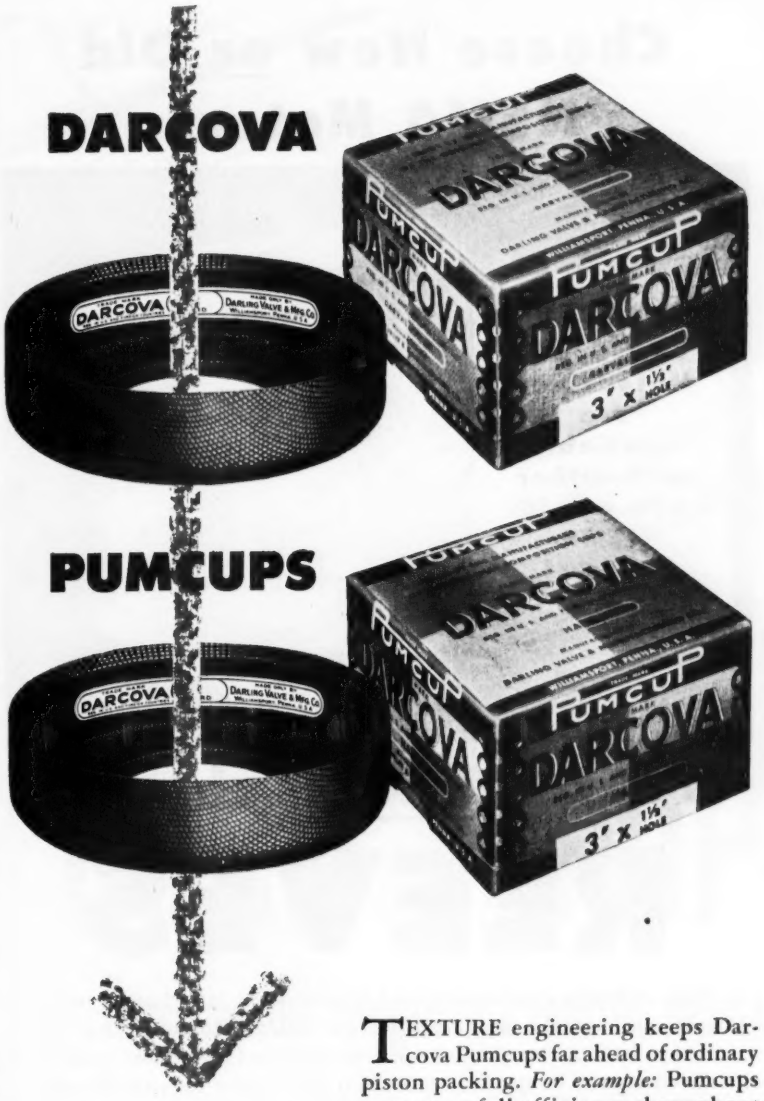
Now to making the soup: To 250 lb. of soup stock, add 12¾ lb. of diced onions, 1 lb. of parsley, 1 lb. of salt, and 1¼ oz. of pepper (white). You might wish to add a small amount of monosodium glutamate to enhance the flavor of the soup. Simmer about ½ hr.

Boil 20 lb. of rice for ½ hr. Fill cans half-full of boiled rice, and then fill with chicken soup. Exhaust cans and then heat-process. Contact your can supplier for details on thermal processing (time and temperature).

Has Boiler Problem

Question—In our cannery, we have recently been troubled with excessively wet steam from boilers, which are operated at about 125 psi. As far as we have been able to determine, feed-water treatment is correct—at least water analysis has remained about the same—and we continue to use a treatment that formerly proved satisfactory. Could you suggest what might be responsible for present difficulty?

Answer—Wet steam (carry-over water with the evaporating steam) may be attributed to the presence of oil in water. It should be relatively easy



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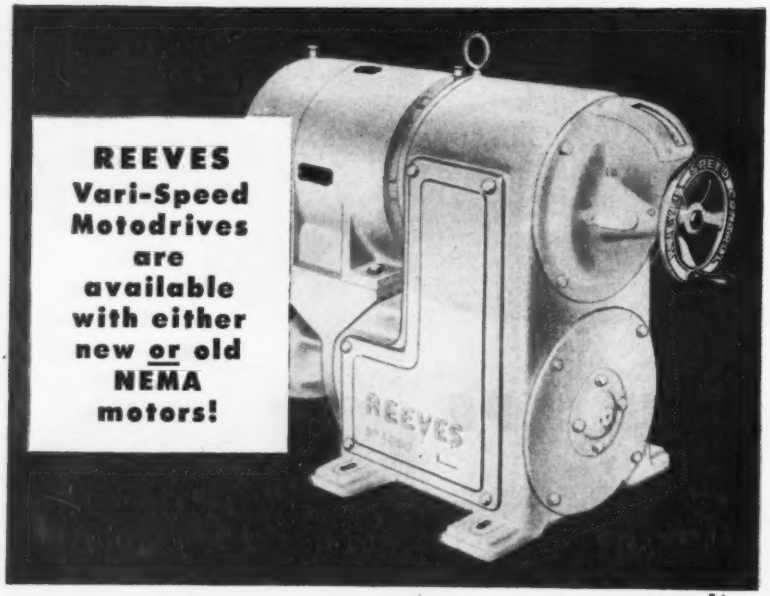

. . . but always choose

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With each new development and improvement in industrial progress—such as the new, smaller size NEMA Motors—you can always look to REEVES to be in step with the latest, most modern developments in speed control. You don't have to wait for new designs or adaptations. In keeping with their fine pioneer tradition, REEVES offers you *now* all the advantages of *smaller* Motodrives in practically every case when you order 1 hp or 2 hp drives with the new NEMA Motors. Write today for complete details to Dept. *FE5-G.*

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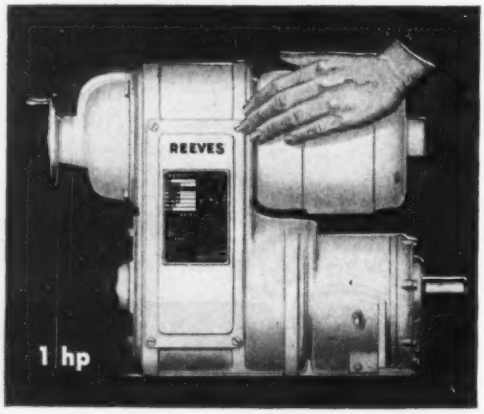
Smaller MOTODRIVES!

for 1 hp or 2 hp with new frame NEMA motors



REEVES PULLEY COMPANY • COLUMBUS, INDIANA

to determine if oil is present, and if it is, it must be removed by centrifuging or suitable type of filtering.

High alkalinity may be ruled out in view of your statement about the boiler-feed analysis and treatment.

According to boiler-accessory and water-treating equipment manufacturers, one of the most common causes of carry-over is improper blow-down practices. Such practices will often result in temporary, excessive concentration of solids—both dissolved and suspended—in the boiler water. This can happen, for example, if you use an intermittent manual blow-down and the operating engineer forgets to blowdown on schedule.

We suggest that you carefully check your boiler-room from this angle. Perhaps you have employed a new operator who has not been fully instructed on this important point.

If you are presently using intermittent blow-down, it might pay you to adopt a continuous blow-down system. In this way, a more uniform solids concentration will be maintained. The continuous method will also facilitate heat recovery from the blow-down operation.

Heat losses during blow-downs can become quite high. Calculated at your boiler pressure, a 1-in. pipe will blow-off around 1,000 lb. per min., and waste the equivalent of some 40 lb. of coal, unless heat is recovered through use of heat exchangers for warming boiler feed.

Wishes to Decolorize Vinegar

Question—Have you any suggestions on how we can decolorize dark cider vinegar?

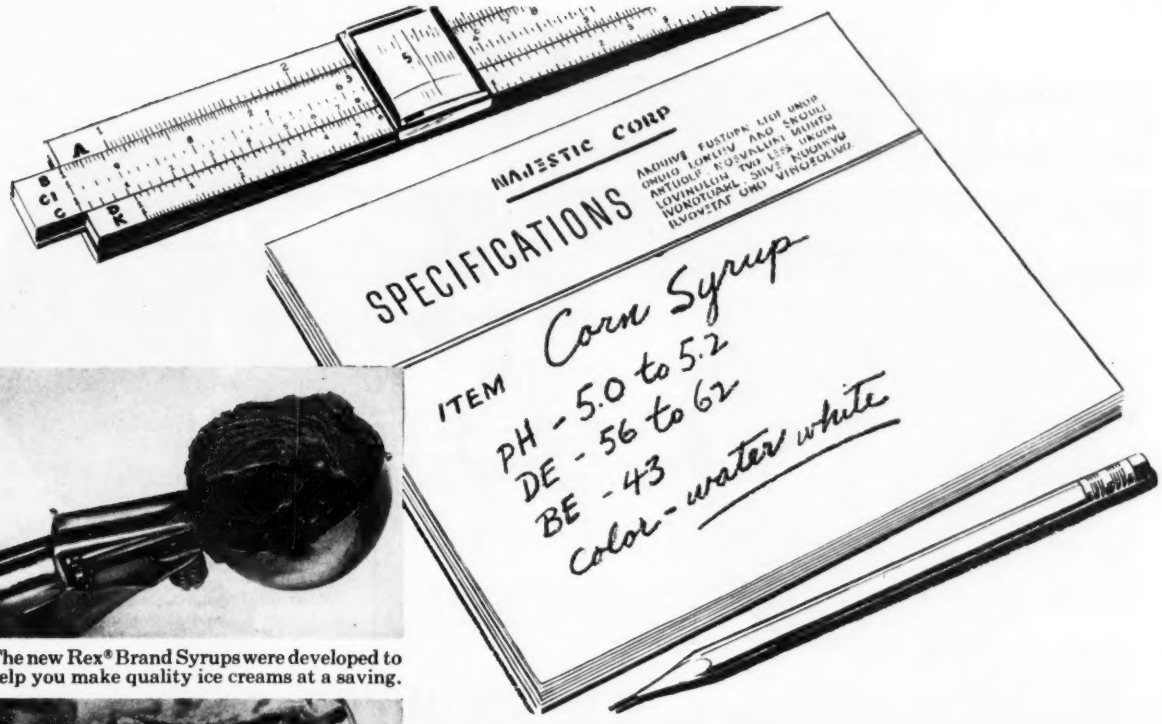
Answer — The best decolorizing agent we know is activated carbon (an adsorbent). This decolorizing agent should be thoroughly mixed with vinegar in a large tank at room temperature. Usually, 20-30 min. is sufficient. Then filter out the suspended carbon.

If the carbon-vinegar mixture is kept agitated while fed to the filter, there will be little danger of carbon settling out or passing through. The size of carbon particles made for this purpose is supposed to permit efficient filtration.

To keep dust at a minimum while adding carbon, try making up concentrated slurry (1¼-1½ lb. of carbon per gal. of vinegar) in an isolated container. Then add slurry to vinegar in the large tank.

Consult with activated carbon manufacturers. They will provide the right grade of carbon and work out correct usage.

You are probably using filter aid



The new Rex® Brand Syrups were developed to help you make quality ice creams at a saving.

You retain the sparkle, color and flavor of pure fruit with Rex or Globe Corn Syrups.

Globe Corn Syrups are without peer in purity, clarity and efficiency as a "doctor". Their inverting power is closely controlled.

The uniformity, clarity and sparkle of Globe® Brand Corn Syrups enables you to maintain constant high product standards.

CORN SYRUP

...tailor-made for your specific need!

Modern corn products technology has developed accurate control of product uniformity and performance. A complete range of corn syrups is available to you from the world's prime producer of corn products. Nor does the service stop there.... We are constantly seeking new variations to offer.

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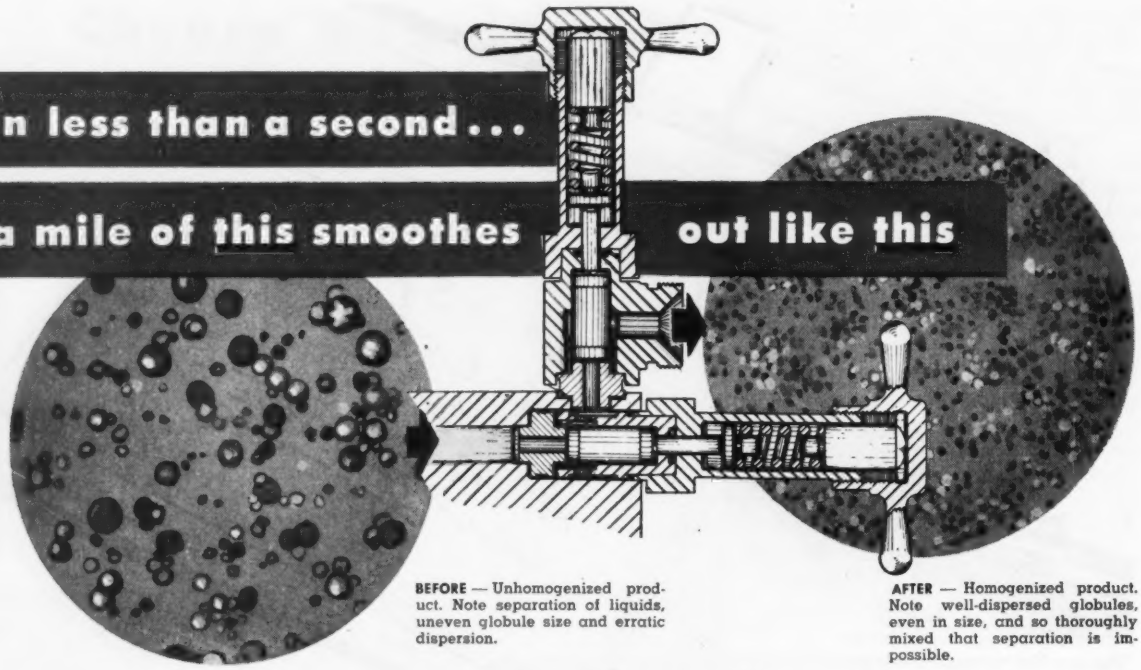
A complete range of corn syrups, tailored to meet your most exacting specifications

CORN PRODUCTS REFINING COMPANY
17 Battery Place, New York 4, N. Y.

For more information, use coupon on page 179.

in less than a second...

a mile of this smoothes out like this



BEFORE — Unhomogenized product. Note separation of liquids, uneven globule size and erratic dispersion.

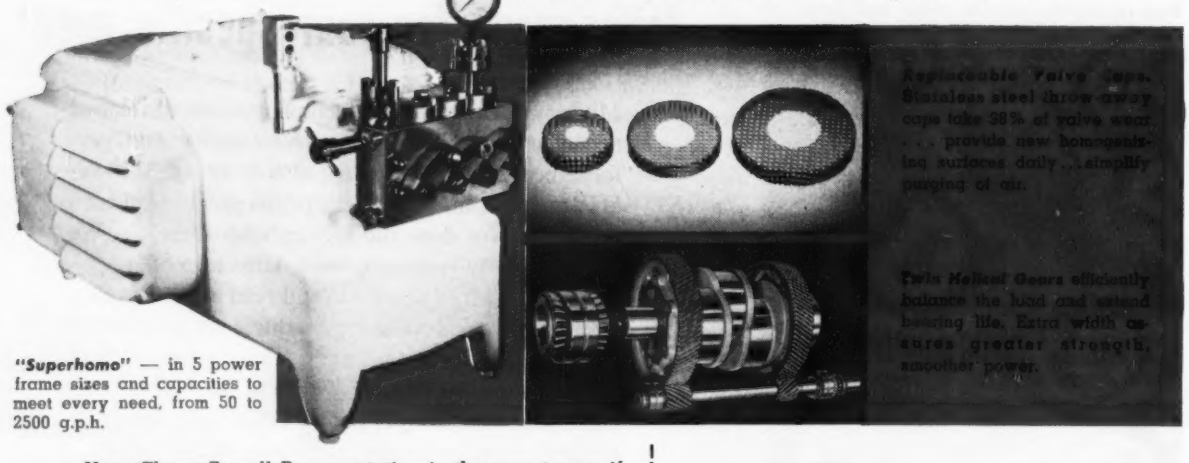
AFTER — Homogenized product. Note well-dispersed globules, even in size, and so thoroughly mixed that separation is impossible.

when homogenized by SUPERHOMO'S amazing valve

Here's the valve that makes homogenization truly effective . . . that improves both the taste and appearance of your product. For when your product passes through this "Superhomo" Homogenizing Valve, it becomes completely homogeneous—*instantly*.

As shown above (right), fat globules are even in size, well dispersed, thoroughly mixed after going through the "Superhomo." Fat separation back to particles of unequal size and dispersion is impossible. This hydraulic shearing action is but one reason why "Superhomo" is industry's most advanced homogenizer.

Other "SUPERHOMO" Strong Points...



"Superhomo" — in 5 power frame sizes and capacities to meet every need, from 50 to 2500 g.p.h.

Replaceable Valve Caps. Stainless steel throw-away caps take 98% of valve wear, . . . provide new homogenizing surfaces daily . . . simplify purging of air.

Twin Helical Gears efficiently balance the load and extend bearing life. Extra width assures greater strength, smoother power.

Your Cherry-Burrell Representative is the man to see if you want the best in homogenizers. Call him or clip coupon for further information.

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Chicago 6, Illinois

☐ Have Representative call.
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City ..... Zone .... State .....

For more information, use coupon on page 179.

and a suitable pressure-type filter to clarify your vinegar. In this case, consult your supplier, who will recommend the correct grade of filter paper.

Remember, it is important to agitate the carbon-vinegar mixture for best results. This may be your major problem, since vinegar is frequently held in large tanks.

If there is difficulty in obtaining a suitable agitator, try bubbling filtered, compressed air from perforated pipes at the bottom of the tank.

Preparing Mushroom Sauce

Question—Our firm is interested in canning a product consisting of cooked noodles in mushroom sauce. Can you suggest a formula for making this sauce?

Answer—We are unfamiliar with the product you refer to—a canned noodle product with mushroom sauce. However, we can furnish you with a formula for a mushroom spaghetti sauce, which you can use as a basis for developing one to suit your taste.

Mushroom Spaghetti Sauce. Add to a steam-jacketted kettle: Tomato pulp (1.040 sp. gr.), 5 No. 10 cans; sugar, 5 lb.; cheddar cheese, 5 lb.; onions, 3 lb.; salt, 2¾ lb.; white pepper, ¾ oz.; paprika, ¾ lb.; beef extract, 4 oz.; garlic, ½ oz.; flour, ½ lb.; cloves (ground), ½ oz.; mace (ground), ½ oz.; celery seed ground, ½ oz.; bay leaves, 2; water, sufficient for 20 gal.; and mushrooms (chopped), 20 lb.

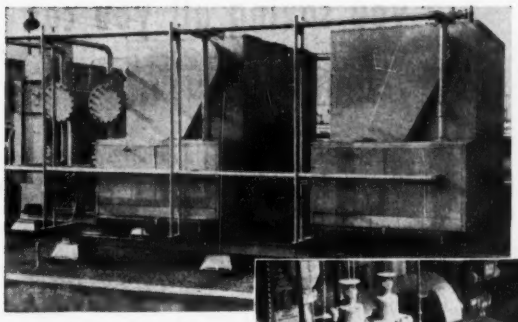
Cooked to desired consistency, and add about 10 or 11 oz. of sauce to 8 oz. of noodles.

Preventing Crumbly Cakes

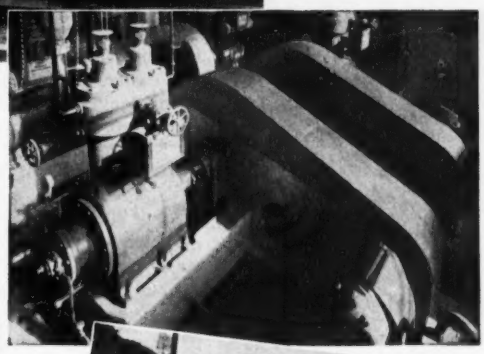
Question—Last year we got into the production of fruit cakes for the first time. However, soon after these cakes left our bakery we were swamped with complaints that they were very dry and crumbly. Naturally, we'd like to overcome this problem before going into production for the coming holiday season. Can you help us lick this problem?

Answer—Not knowing your formula, we can only guess. We believe that crumbling and drying of your fruit cakes is due to recrystallization of granulated sucrose sugar (cane or beet), which is normally used. Consequently, recrystallized sugar will make cake become dry and crumbly.

Only by adding a sufficient amount of invert sugar (a moisture-retaining and sugar crystal-checking agent) will drying of cake be overcome. It is suggested, therefore, that you replace about 5 percent of your sucrose sugar with invert sugar to make fresh-keeping, easy-to-slice fruit cake.



Merchants Ice and Cold Storage Co.



they're in on the ground floor in San Francisco

...and so is VILTER

Merchants Ice and Cold Storage Company of San Francisco is no Johnny-come-lately to the West . . . they've been doing business there since 1893. "Merchants" is no old fogey, either, since their newly remodeled plant is a model for all that's new in cold storage. Entirely on one floor, the new plant eliminates elevators and manual handling, to cut costs and speed movement in and out of storage. To add to that, office space over the warehouse makes operation convenient for warehouse space lessees.

Two Vilter Vertical Compressors and two Vilter Boosters were installed to handle the load, but they are working so well, and design and construction of the buildings is such that even during the summer one compressor and one booster usually suffice. The Vilter machines operate automatically, and are alternated every two to three weeks to equalize running time. Vilter Shell and Tube Condensers and Vilter Evaporative Condensers help to increase the efficiency of the installation.

There's nothing unusual about a Vilter installation that's economical beyond expectations, because Vilter refrigeration equipment is designed and built—entirely by Vilter—with that extra measure of care that makes the difference between "good" and "excellent." Thousands upon thousands of users of refrigeration all around the country save money on operation and upkeep with Vilter. Probably Vilter can help you save, too.

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Your nearby Vilter Representative or Distributor will be glad to show you how Vilter refrigeration can help you cut costs in your plant.

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Air Conditioning • Ammonia & Freon Compressors • Booster Compressors • Baudelot Coolers • Double Pipe Coolers • Blast Freezers • Evaporative & Shell & Tube Condensers • Pakicers • Pipe Coils • Valves & Fittings

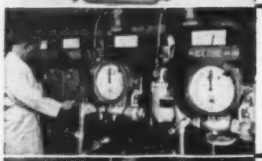
For more information, use coupon on page 179.

√ Are you saving all you can with Liquid Meters?

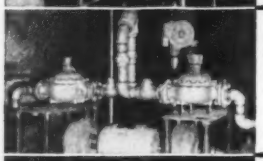
Here's a check-list of savings made every day with accurate metered measurement of more than 150 industrial liquids. Chances are you can use at least five of these ideas in your plant:

√ **AUTOMATIC BATCH MIXING:** Meter liquids directly to tanks or kettles with Neptune Auto-Stops. Push buttons to set quantity . . . meter cuts off accurately, automatically. No waiting for weigh tanks to fill, no "inching" up to gauge marks, no wrestling with bags or buckets.

√ **AUTOMATIC PROCESS CYCLING:** Auto-Stop meters can be equipped with electrical switches to start or stop pumps, agitators, etc. . . . automatically. Saves times, labor, power . . . with closer control.



√ **ELIMINATE REJECTED BATCHES:** In one leading pharmaceutical plant, Neptune meters eliminated human errors, saved enough costly ingredients to pay for the meters in less than a month! How's your "reject" rate?



√ **EASIER INVENTORY, COST CONTROL:** Neptune Meters at key check points keep track of inventory, interdepartmental use, production rates, etc. They put a stop to waste, verify full measure received or delivered.

√ **AUTOMATIC DRUM FILLING:** This Neptune fills drums, radiators, fuel tanks, etc., with exact quantity every time you press the handle. Saves time, labor, prevents spills or "shorts."

√ **OIL BURNERS, DIESELS:** Use these low-flow meters instead of bulky day tanks to measure fuel consumed by boilers, melting furnaces, diesels, etc.

√ **WATER CONDITIONERS:** Trident meter's wary eye tells when ion exchange unit needs recycling. See if yours has trouble-free Trident.

√ **TANK TRUCK DELIVERIES:** Many industrial liquids can be delivered by metered trucks with greater ease and accuracy than markers, gauges or sticks. Investigate Red Seal meters.

Give you any ideas?

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Wants to Make Sausages

Question—Our operations are small, being limited to the manufacture of frankfurters and bolognas. We seek formulas and information on manufacturing fresh pork sausage and smoked pure sausage. Can you help us?

Answer—To make fresh pork sausage, grind 150 lb. of fresh, chilled pork trimmings through a 1-in. plate. Then put the ground trimmings in a mixer and add cane sugar, 7½ oz.; salt, 4 lb.; white pepper, 9½ oz.; sage, 1½ oz.; ginger, 1½ oz.; mace, 1½ oz.; and marjoram, ¾ oz.

If you prefer a sausage without sage, then substitute the following spices for the above: White pepper, 7½ oz.; celery seed (ground), 3 oz.; ginger, 1½ oz.; cardamon, 1½ oz.; and cloves (ground), ¾ oz.

Mix thoroughly, but not enough to tear up the meat. Put sausage meat in 36-deg. F. cooler until wet chilled, and stuff into sheep casing. Hang on sausage trucks overnight in 36-deg. F. cooler.

Now to preparing smoked pork sausage: Grind 150 lb. of fresh pork belly trimmings (15 percent fat) through a ½-in. plate. Then regrind through a ⅛-in. plate. Blend in mixer for 4 min., adding salt, 3¾ lb.; sugar, 10 oz.; sodium nitrate, 4½ oz.; white pepper, 7½ oz.; sage (ground), 3¾ oz.; coriander (ground), 1½ oz.; and mace (ground), 1 oz.

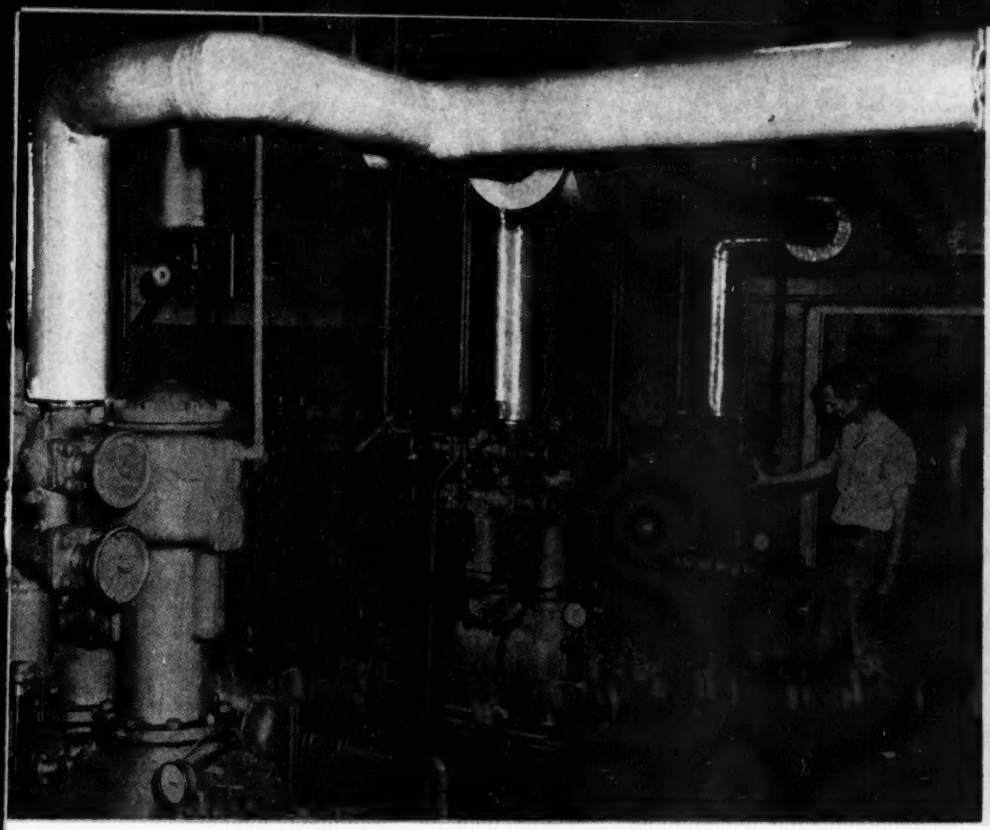
Stuff into 1½-in. Visking casing, and link at about 5-in. lengths. Hang links on sausage truck, spray with cold water to remove pieces of meat adhering to outside of casing, and put in 36-deg. F. cooler for about 12 hr. Then leave at room temperature for about 3 hr., smoke 4 hr. at 120 deg. F., and keep at room temperature for about 3 to 4 hr. before running into cooler.

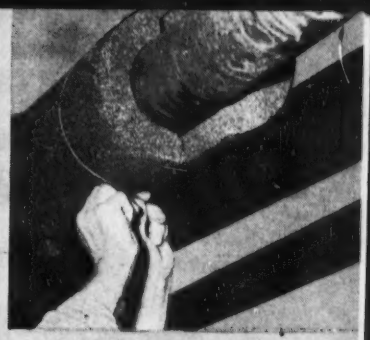
Q.—Has quick freezing any adverse effect on vitamin A and B content of foods?

A.—Comparisons of vitamin A values in fresh and frozen foods indicate little, if any, loss caused by quick freezing.

The vitamin A values are conserved by storage at low temperatures, especially when put up in practically impervious packages and held away from light.

Vitamin B_1 is not affected by quick freezing, but some loss may occur while blanching vegetables. Almost no loss of vitamin G riboflavin has been observed in such frozen vegetables as peas, spinach, broccoli, lima beans, and asparagus.





Here FOAMGLAS is shown being applied to the piping.

Utility tunnelway in which hundreds of feet of refrigerated tubing are insulated with FOAMGLAS.

LAKE TO LAKE DAIRY reports: "We can salvage FOAMGLAS insulation because it stays dry during piping changes."

Wesley Wise
Production Manager,
Lake to Lake Dairy

Wesley Wise, plant production manager of the Lake to Lake Dairy Co-operative, at Kiel, Wisconsin reports: "Because of the continual shifting of equipment due to changing markets in the dairy business, we have the problem of breaking into insulation to make new connections. FOAMGLAS pipe insulation . . . a strong, rigid structure of sealed glass cells . . . can not become watersoaked during such changes.

"On a complete remodeling job, the cloth which covers the piping can be cut along the joints and the FOAMGLAS salvaged for use at another location, re-covered with new cloth, and the insulation made as good as new in effectiveness and appearance. FOAMGLAS' rigidity enables our maintenance crew to apply it and easily obtain a professional looking finish."

Like the Lake to Lake Dairy Co-operative, you can benefit from the many advantages FOAMGLAS has to offer. Unlike ordinary pipe insulations, FOAMGLAS stays dry, assuring constant life-long insulating performance and avoiding corrosion of piping.

For more information, you should send for our new booklet detailing the use of FOAMGLAS for piping and equipment. Use the coupon below.

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FOAMGLAS®

the cellular, stay-dry insulation

PITTSBURGH PC CORNING

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Pittsburgh Corning Corporation, Dept. O-34
One Gateway Center, Pittsburgh 22, Pa.

Please send me a free sample and the following brand new FOAMGLAS literature:

- ☐ New booklet on FOAMGLAS building insulation.
- ☐ New booklet on FOAMGLAS low temperature insulation.
- ☐ New folder on FOAMGLAS pipe insulation.
- ☐ New folder on FOAMGLAS insulation for tanks and other equipment.
- ☐ Send engineer to discuss specific problem.

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Company _____ Title _____

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since 1928 / Glycerine is the Humectant

Keeping foods fresh by its ability to retain moisture is only one element of Glycerine's value to food manufacturers. In candy, for example, Glycerine acts not only as a humectant but also lends smoothness to mixtures, helps to assure more uniform distribution of flavorings, and contributes to palatability.

In compounding flavoring preparations, Glycerine often acts as a solvent, and at the same time adds body to the product. Glycerine is used—as a plasticizer—in the manufacture of meat casings, both animal- and cellulose-type. Glycerine is also used as a plasticizer in many food wrapping materials, such as cellophane and vegetable parchment.

In dozens of other food applications, Glycerine's unique range of properties and freedom from toxicity make it an outstanding favorite. The free booklet, "Glycerine . . . Preferred for Product Conditioning," contains helpful data on Glycerine properties and applications. For your copy, write Glycerine Producers' Association, 295 Madison Avenue, New York 17, N. Y.

For over a quarter of a century, E. J. Brach & Sons, Chicago candy makers, have used U.S.P. Glycerine in marshmallows, lozenges, and pure sugar grained candies. Glycerine's ability to retain moisture lengthens the shelf life of Brach candies . . . keeps them fresh and delicious for much longer periods.

Nothing takes the place of Glycerine

Making Celery Salt

Question—How will I go about preparing celery salt, which is to be packed in 3-oz. glass containers?

Answer — Blend in a ribbon-type horizontal mixer, 50 lb. of ground celery seed and 150 lb. of flake salt. Next run mixture through a pulverizer and sift through a No. 24-mesh sieve. Celery salt is now ready for filling into glass jars.

Seeks an Inspection System

Question—In the manufacture of jams, jellies, and preserves, we use frozen fruits which are shipped in wooden barrels and No. 10 tins. Our firm has overlooked one very important step in the production of high quality finished products. Fruits are not given an efficient, thorough inspection prior to loading them into the cooking kettles. Could you suggest a suitable set-up for such an inspection system?

Answer—Preservers differ somewhat in the type of inspection system they employ. Your choice of a system will depend upon the amount of money you wish to invest.

Naturally, you will want to spread out the fruit in some manner in a well-lighted area so that it can be examined for defects and foreign matter.

One of the simplest arrangements is to use a sloping table with low edges. Fruit can then be dumped on highest part of table directly from tins or by the pailful from barrels. An inspectress can readily examine fruit and slide it down-hill to fall into a suitable container.

A more elaborate inspection system comprises several vibrating-type metal tables arranged in cascade fashion. Advantage of this system is the turning of the fruit as it progresses from level to level. Of course, this turning of the fruit enables the inspector to more readily spot defects—a feature not possible on a stationary table.

While these vibrating tables occupy more space and require more personnel than stationary ones, they should enable preserver to inspect a greater amount of fruit.

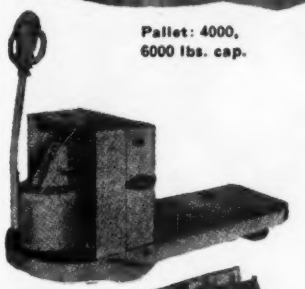
Another variation is an inspection table with a glass or transparent plastic surface (Lucite, for example), illuminated from below. This table could be useful for inspecting light-colored fruits for the presence of such objectional dark materials as stems or pit fragments.

Where volume warrants, it is possible to use a moving belt of type employed in canneries for sorting and trimming fruits and vegetables. It would be wise to specify a belt with a

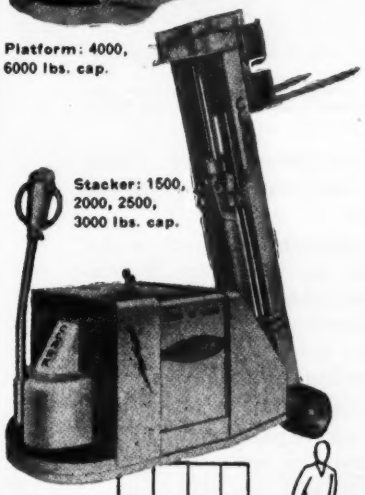
Announcing the
POWRWORKER "26"

FEATURE BY FEATURE, IT'S ENGINEERED TO MEET YOUR OWN HANDLING REQUIREMENTS

Pallet: 4000, 6000 lbs. cap.



Platform: 4000, 6000 lbs. cap.



Stacker: 1500, 2000, 2500, 3000 lbs. cap.

Detailed job-studies in customer plants, warehouses and terminals dictated the features of the POWRWORKER "26". No truck on the market today can match the POWRWORKER'S combination of *user-benefits:*

- **Maximum Maneuverability** — Only 26" longer than the load, the shortest standard truck on the market.
- **Light Weight**—Completely fabricated construction combines maximum strength with least weight.
- **Stability**—Close-to-the-floor, low center of gravity.
- **Great Efficiency**—Double reduction of spur gears gives maximum ton-miles at least power cost.
- **Balanced Load Distribution**—Double lift cylinders for smooth lifting and lowering.
- **Safety**—Deadman switch cuts power when brake is applied, handle automatically returns to brake-position.
- **Easy to Service**—All operating units accessible without lifting or dismantling. Drive wheel tire is quickly demountable.

We invite you to compare the 1954 POWRWORKER with any truck on the market! For details, call your local Clark dealer, listed in the Yellow Pages. Or send the coupon for literature.

Ask your Clark dealer about Clark's low-cost Pay-As-You-Go leasing plan.

CLARK EQUIPMENT

POWRWORKER SECTION
Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 14, Michigan

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☐ Have representative call.

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uniform surface retards wear ...provides greater pulley grip

Globe Solid Woven White Cotton Belting conveying layer cakes for boxing and wrapping in a modern bakery.

Famous Globe Solid Woven White Cotton Belting is being used successfully today by more and more food processors in a wide variety of applications.

Firmly woven into a balanced, continuous construction that eliminates excessive stretch and ply separation, it minimizes down-time and upkeep and adds years of extra life. It holds fasteners better than belting of looser woven construction. Its uniform surface has more resistance to wear, better pulley grip and better distribution of abrasive action.

Globe Solid Woven White Cotton Belting is made in all widths up to and including 62", and in plies from 2 to 8 inclusive. Special widths and extra plies are made to order at short notice.

With more than 35 years experience in the food processing field and a complete line of belting engineered for particular jobs, all available with special treatment, Globe is well prepared to help you with the *right* belt for *any* belting problem.

For free samples and literature — and the name of your local distributor, write Dept. E

GLOBE WOVEN BELTING CO., INC.
1400 CLINTON STREET BUFFALO 6, NEW YORK

KNOWN FOR QUALITY THE WORLD OVER

flange or ridge along each side so as to prevent juice from running off conveyor and onto the floor. Advantages of this type of inspection system is its flexibility—the belt speed and number of inspectors can be changed in accordance with the amount of fruit to be examined.

Whatever equipment you select, remember that good lighting is essential, otherwise it would be difficult for the inspectors to spot defects. You may wish to experiment with different colored lights to determine which is the most suitable for the fruits.

And another thing, instruct your inspectors on types of defects to look for, and rotate them frequently so they will not become fatigued and inefficient.

Where moisture must be added, humidifiers should be installed.

Formulating Diabetic Jelly

Question—Please furnish me with a formula for making a low calorie diabetic jelly.

Answer—Formulas for manufacturing diabetic jellies are not available inasmuch as they are the property of companies that developed them.

However, developing formulas yourself should not be difficult, since it involves substituting sugar with a nonnutritive, artificial sweetener.

We suggest that you pick up a jar of commercially packed diabetic jelly from a retail-store shelf. Then set up a theoretical formula, based on the ingredients listed on the labeled jar. Too, the caloric content (also listed on the label) should help you figure out such a formula. Then the only other problem would involve determining the amount of pectin needed to set the jelly.

Ingredients listed on a jar of commercially packed diabetic jelly purchased in a local retail store included: fruit juice, specially prepared pectins, citric acid, and 0.05% sucaryl (a nonnutritive, artificial sweetener). The label also stated that there were 3 calories per tablespoon serving.

Formula for Curry Powder

Question — Can you furnish me with a formula for making curry powder?

Answer—In a steel bin, mix the following ground spices: Tumeric, 120 lb.; coriander seed, 90 lb.; black pepper (Lampong), 45 lb.; cumin seed, 45 lb.; ginger (Jamaica), 37½ lb.; fenugreek seed, 37 lb.; cloves, 15 lb.; celery seed, 15 lb.; caraway, 7½ lb.; garlic 4½ lb.; and mace 4 lb.

Pulverize the blend of spices and run through a No. 8-mesh sieve.

For superior ice cream flavor at lower cost...

...use *VANITROPE,* a pure, vanilla-like flavoring material exclusive with Shulton. 15 to 25 times stronger than vanillin, VANITROPE heightens the flavor of vanilla and other ice creams and effects flavor-savings up to 50% at the same time. Chocolate, butter, fruit, nut and other flavors are also benefited by VANITROPE.

Basic studies recently completed by the Dairy Experimental Station of a leading university developed proven procedures for using VANITROPE in high quality ice creams. Shulton Technical Bulletin No. 23, *available on request,* describes these tested and approved procedures.

VANITROPE (brand of propenyl guaethol) is rigidly controlled in manufacture. Now used in hundreds of nationally known food products, VANITROPE is stable in price, quality and availability. Shulton's Technical Service is available should you wish assistance in integrating VANITROPE into your formulas.

Samples available on request

SHULTON, Inc.

FINE CHEMICALS DIVISION • 630 FIFTH AVENUE
NEW YORK 20, N. Y.

For more information, use coupon on page 179.

It's the Nash!

The ability of Nash Compressors to maintain original performance over long periods is no accident. Nash Compressors have but a single moving element, the Nash Rotor. This rotor is precision balanced for long bearing life, and it revolves in the pump casing without metallic contact. Internal lubrication, frequent cause of gas contamination, is not employed in a Nash. Yet, these simple pumps maintain 75 lbs. pressure in a single stage, and afford capacities to 6 million cu. ft. per day in a single compact structure.

Nash Compressors have no valves, gears, pistons, sliding vanes or other enemies of long life. Compression is secured by an entirely different principle of operation, which offers important advantages often the answer to gas handling problems difficult with ordinary equipment.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. Because there are no internal wearing parts, maintenance is low. Service is assured by a nation-wide network of Engineering Service offices. Write for bulletins now.

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature Automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

NASH ENGINEERING COMPANY

312 WILSON, SO. NORWALK, CONN.

Statistical Control

—Continued from page 46

too often it has resulted in failure.

Statistically-minded brewers inherently realize the fallacy of relying on one man's judgment and seeking direct preference expressions. They have instituted regular schedules of panel-type testing and seek the ability to differentiate rather than mere indications of like or dislike.

After all, if one cannot distinguish between two samples how could an honest, usable preference exist?

It is well known that the public is quite label-conscious in its testing and is not apt to be as discerning of beer as those who make it. Untrained tasters, in fact, find it difficult to distinguish correctly and at significant levels between a number of brands on today's market.

Panel Methods

To detect subtle differences in beer, personnel on brewery taste panels are trained in descriptive vocabulary and in various elements of flavor perceptions. A number of distinctive types of tests are used, and data are evaluated with reference to their deviation from results expected from chance distributions.

A common approach consists in comparing three glasses of beer under controlled conditions. Two of the glasses contain one of the samples to be compared, and the third holds the second sample. Thus, chance dictates a correct judgment of difference—even if none exists—one time in every three trials.

By submitting the samples to at least 20 persons in this fashion, one can draw valid conclusions.

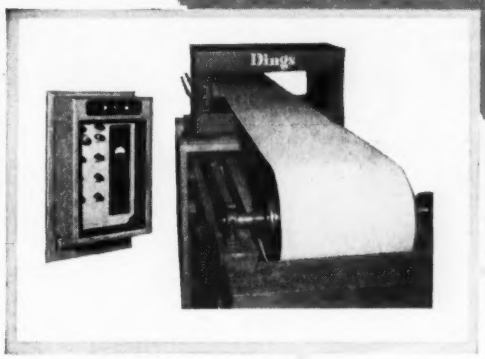
Also, if fewer judgments must be used, then two samples can be adequately compared in five glasses. If three are of sample A and two of B, the odds of making a correct choice from chance-influences are 1 in 10. Thus, the sensitivity of the method is increased, and the binomial theorem can yield useful figures of significance for any number of tests presented.

III—Tightening Operations

Suppose, now, that a brewer has targeted his market and pinpointed those significant factors in flavor, body, and color that have proved to constitute ideal sales appeal for his product. Statistical methods now sharply enter the picture in helping to assure these ideal standards—at a profit.

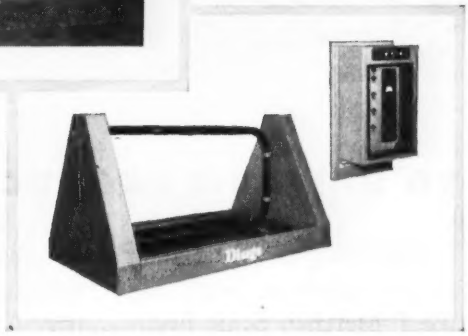
Primary tool in tightening in-plant operations is the control chart—already a familiar device in many breweries.

Dings presents a new Electronic Metal Detector with "ultra high sensitivity"



for General Industrial Service . . . in any industry where tramp metal is a hazard to machinery or product quality.

for Deep Burden Service . . . in mining and other industries where extremely deep burdens may be encountered.



• *NOW*—end your tramp metal problems *electronically* with the new *Dings Electronic Metal Detector*. This positive, proved detector is sensitive to *all* metals . . . detects even minute particles and signals their presence . . . thus protecting processing equipment and guarding against product contamination.

Available with a wide range of signal and reject systems to meet specific requirements, the new Dings Electronic Metal Detector is built in several sizes to fit into practically any processing arrangement.

Let the experienced Dings engineering staff help in solving your metal detection problems. *See your nearest Dings representative or mail the coupon for free literature.*

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DINGS ELECTRONICS, INC.
(subsidiary of DINGS MAGNETIC SEPARATOR CO.)
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Please rush copy of the new Dings Electronic Metal Detector Bulletin B-1920-A.

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For more information, use coupon on page 179.

"magic carpet"

TO UNIFORM PRODUCT QUALITY

The results may not show on your package label, but W&T Merchen Scale Feeders with continuous weigh-belt for weighing and feeding in one operation — can help to maintain uniform high quality in final product.

Precision scaled, durably constructed and simply controlled, W&T Merchen Scale Feeders deliver minute to minute accuracy whether feeding only a few or many thousands of pounds per hour. In modern food processing operations — premixing, batching and continuous blending — this exacting accuracy is a requisite. As further assurance of uniform quality, the Feeder may be synchronized with other equipment to shut-down automatically in the event of any equipment or supply failure.

If you have a food processing problem requiring uniform feeding and control — automatically by weight — communicate today with Wallace & Tiernan. Your inquiry will receive prompt attention without obligation.

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Essentially, the control chart displays its most potent possibilities by simply presenting normally columnized data in a manner that dramatizes significant process deviations. Fig. 2, for example, illustrates just what happened when the wort-extract value in one brewery was put on a control chart.

In this operation, hydrometer readings were made of every brew and the figures were plotted between and around the desired norm of 11.35 Balling. After several brews—with this chart on display—the attendants evidently started to develop a competitive spirit and attempted to achieve maximum yield. As a result, by month's end the average wort extract had soared by at least 1 deg. Balling over expected control limits.

Apparently these operators in their zeal, ignored the significance of the upper limits of the control chart. But here ignorance was bliss, since this brewer was faced with the profitable decision of either reducing ingredients or producing a heavier product.

Fig. 3 illustrates a more usual case history where yield factors were already fixed, and deviations above and below control limits would be caused primarily by differences due to assignable causes.

In this instance, movement out of range was due to failure to check correctly on ingredient weight—or, as in those high extract values, it was simply addition of one bag too many of grits to the cooker.

Perhaps the widest application of the control chart has been in bottling operations where it is helpful in checking over-filling and evaluating bottle washing performance.

Statistical Inspection

Another profitable possibility for SQC in tightening operations is the improvement by statistical sampling of normally heavy manual inspection procedures.

All brewers attempt 100% inspection to eliminate defective and dirty bottles before they reach the shipping container. They provide excellent inspection light and post their most dependable workers by these stations.

One such brewery, for example, placed three inspectors by its filler line and was proud of its program, which aimed at less than 0.15% defective bottles going out. But when a statistician measured the performance of this inspection on a sampling-plan basis—one case opened and scanned each half hour—it was indicated that 0.6% defectives were getting out.

Needless to say, this revelation by statistical sampling shocked the bottle house superintendent, and he put

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2. Non-mysterious simplified lubrication
3. Labor cost reduced
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5. Errors in application reduced
6. Simplified, speeded-up purchasing

Be *sure* with Pure — Sales offices located in more than 500 cities in Pure's marketing area.

Hundreds of plants already are saving real money by reducing their inventory from dozens of different oils and greases to *a few Pure Oil multi-purpose lubricants*—lubricants scientifically formulated to do many different jobs equally well.

Investigate the savings possible in your own plant with this *simplified* lubrication program. Pure Oil industrial specialists will be glad to help you set up a money-saving, labor-saving procedure tailored to your particular plant needs.

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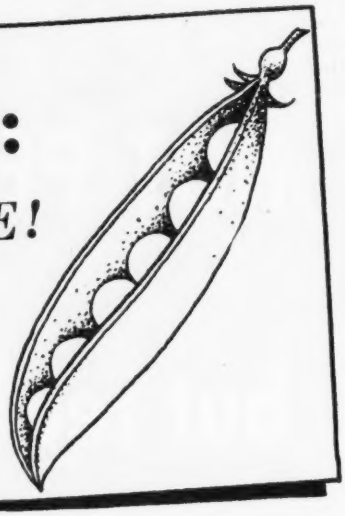
Famous Fallacies:

that Peas in a Pod are ALIKE!



ANSWER: Like a family of children, they vary in both size and quality. To grade them properly you need a Taylor Brine Density Control System or your pea grader*.

TAYLOR CONTROL GRADES PEAS AUTOMATICALLY BY REGULATING BRINE DENSITY!

YOUR grader equipped with this system, will grade peas efficiently and economically by the flotation principle. With this system the density of the brine is measured in a Sight Feed Bubbler by means of a Taylor High Accuracy Mercury Manometer. Any change in brine density in the grader is quickly detected and the Recording Controller opens *brine* or *water* valves to return it to the correct value.

Completely automatic control is obtained by the use of two throttling type control valves on the brine and water lines, both operated by the same Controller, but staggered so that only one can be opened at a time. Thus brine density can be *diluted* as well as *increased* as required, by simply adjusting the controller set point.

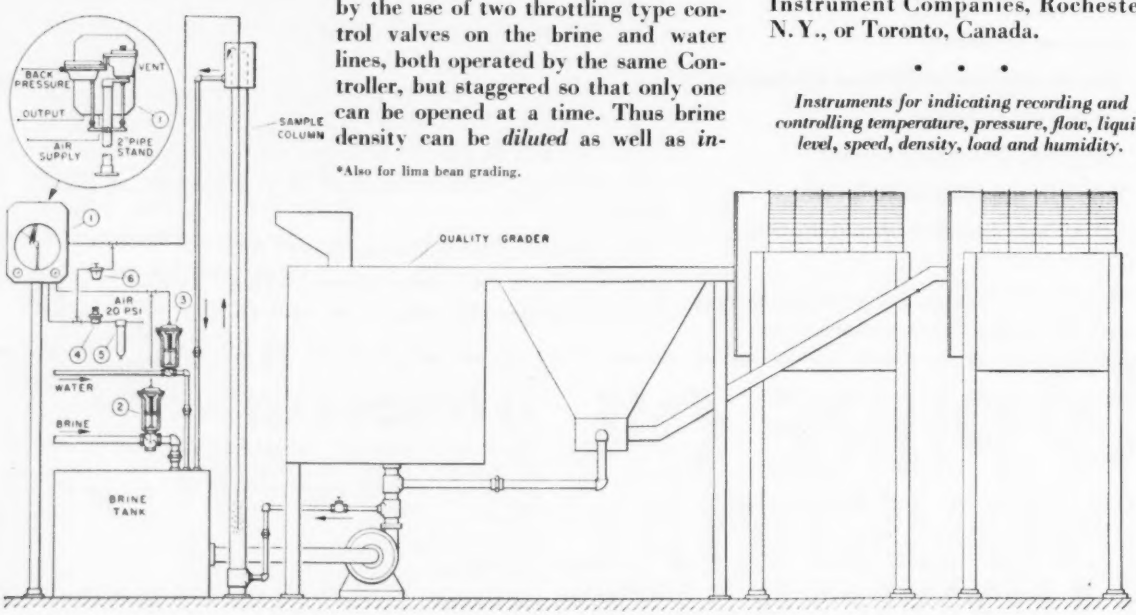
RESULTS: 1. The maximum yield of top quality peas—continuously and automatically. **2.** Salt consumption reduced to minimum requirement.

More than 50 of these Brine Density Control Systems are now in successful operation. **A limited number are available for immediate delivery.** Call your Taylor Field Engineer or write Taylor Instrument Companies, Rochester, N.Y., or Toronto, Canada.

• • •

Instruments for indicating recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

*Also for lima bean grading.



TAYLOR INSTRUMENTS MEAN ACCURACY FIRST

pressure on inspection to reduce the defects by one-third within a period of a month.

In this same bottling shop, a month's statistical study of total defective bottles permitted the development of a prediction of the average number of such bottles which could be expected in a given time at the fillers. Hence, when the line foreman tabbed the number of rejected bottles daily and compared this figure with predicted quantity, he had a good measure of inspection performance.

However, while acceptance-sampling is useful in supplementing the 100% inspection now employed, the desire for perfect removal of all containers holding foreign bodies is so high that it appears unlikely that statistical techniques will ever eliminate this practice.

More Uniform Supplies

Vendor ratings have not, in a true statistical sense, been widely used by brewers. However, at least three but fewer than six of the country's 250 companies now have partial programs in this useful SQC field.

Usually involved in these programs are construction of frequency distribution diagrams of a large number of lots submitted by each supplier of variable items, such as malt and adjuncts. Penalty points are then awarded on a standard deviation scale.

In such a program, care is taken not to penalize twice for correlated measurements, and full discussion between vendor and buyer is usually necessary before agreeing on penalty values.

Due to the natural deviation of malt and other major brewing materials, acceptance sampling procedures are not advisable without some solid preliminary conferences with suppliers. When specifications exist, tests on a single sample taken in prescribed manner are usually sufficient for rejection—although at times a referee laboratory may be called in on a controversy.

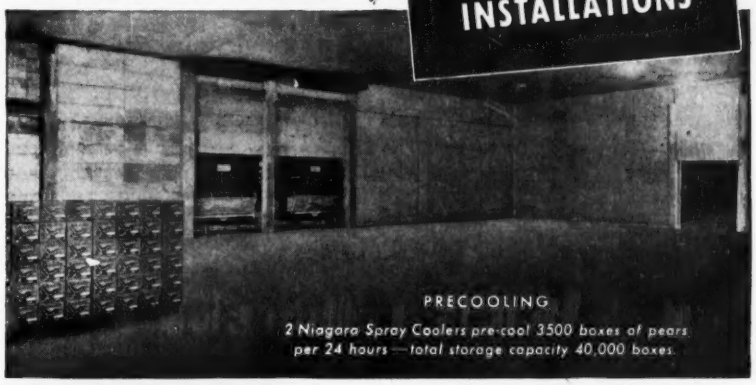
Acceptance sampling plans, however, have been very useful in evaluating shipments of such manufactured items as bottles, cartons, crowns, bungs, and the like.

One such statistical approach to bottle purchasing has been pushed for several years by the Brewers Industrial Foundation. As yet, the desired specifications are narrower than inherent variations in bottle manufacture due to mold wear and other factors. However, the bottle makers themselves are turning statistical techniques to these manufacturing problems and a general upgrading in bottles is already evident.

End (Resume reading on page 47)

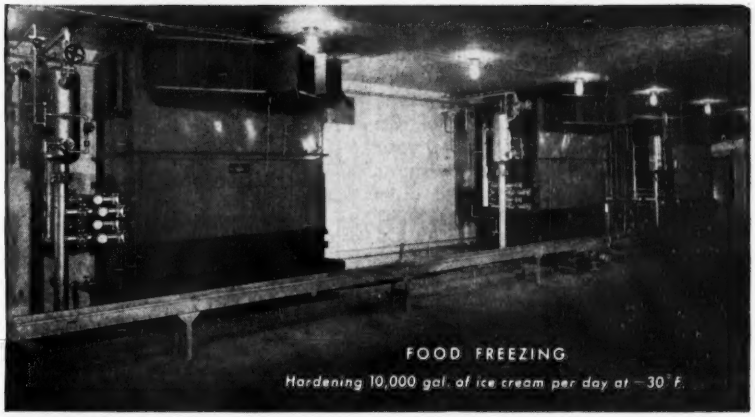
NIAGARA "No-Frost"

SUCCESSFUL IN BIG INSTALLATIONS



PRECOOLING

2 Niagara Spray Coolers pre-cool 3500 boxes of pears per 24 hours—total storage capacity 40,000 boxes.



FOOD FREEZING

Hardening 10,000 gal. of ice cream per day at −30° F.

FROZEN FOOD STORAGE

Room 80 ft. x 135 ft.—Temperature −5° F.

NIAGARA "No-Frost" gives you extra capacity and better operation. It improves quality, especially in foods, where it brings the product to correct temperature faster and holds it without fluctuation. It saves money for you in the cost of power and labor. With Niagara "No-Frost" there is never any "de-frosting" loss of time or temperature rise.

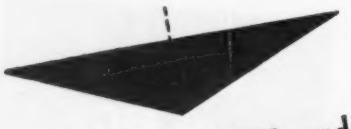
Write for Bulletin 105

NIAGARA BLOWER COMPANY

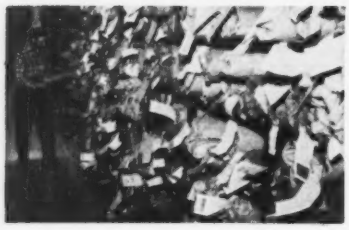
Dept. FI, 405 Lexington Ave. New York 17, N. Y.

Sales Engineers in Principal Cities of U. S. and Canada

For more information, use coupon on page 179.

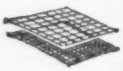


your **WIRE CLOTH** needs may be in stock at **CAMBRIDGE**



Supplies of many of the most frequently used types of industrial wire cloth are kept in our warehouse ready for immediate shipment to you. And even if the type you use is not in stock, we can schedule our looms to have your material in your plant without delay. Any metal or alloy; sizes range from 20 x 250 mesh up to 4" openings . . . and accurate mesh count is our pride.

also FABRICATED PARTS



Filter leaves, strainers, sizing screens, etc. We can fabricate most any type of part you need, in any quantity. We'll work from your own prints or, if none are available, our Engineering Department will draw up prints from your description of what the part must do. Once you've O.K.'d them, we'll start production.

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Useful New Books & Government Publications

Catalytic Processing

CATALYSIS VOL. I. *Edited by Paul H. Emmett. Published by Rheinhold Publishing Corp., 330 W. 42nd St., New York, 1954. 394 pages. 6¼x9¼ in., cloth. Price:* $10.00.

First in a series designed to provide research chemists with complete and authoritative data on the physical chemistry of catalysis and catalytic processing, book covers not only established principles, but delves into a wide range of recent concepts in the field.

Fundamental theory is thoroughly discussed in this first volume, while catalyst supporters, carrier, and methods of preparation also receive full treatment.

Of value to physical chemists concerned with catalytic reactions, book is indexed and illustrated with charts and tables.

Population and Foods

THE WORLD'S FOOD. *By M. K. Bennett. Published by Harper & Bros., 49 E. 33d St., New York 16. 1954. 282 pages. 6x8¼ in., cloth. Price:* $4.00.

A review of the basic facts of food economy based on an analysis of the world's population changes, the book presents significant new findings in this field. The author reveals the basic problem of population and food as being one of quality rather than quantity.

A future guarantee of improved universal food quality is possible through the spread of food technology in food production, states the author.

Significant chapters deals with the impact of hunger on eating habits, as well as major food problems in wartime. Substantiated with charts and statistical tables, the work is of interest to food plant men concerned with the economic effects of their products.

The Agricultural Market

READINGS ON AGRICULTURAL MARKETING. *By Frederick V. Waugh. Published by Iowa State College Press, Press Building, Ames, Iowa. 1954. 456 pages. 6¼x9¼ in., cloth. Price:* $5.00.

Viewpoints of more than 150 economists on the problems of agricultural marketing are expressed in this authoritative new book.

Chosen to cover a wide range of subject matter from public attitudes to government supervision, the readings present differing viewpoints on controversial matters. Of special interest to food plant men processing agricultural products, the book is completely indexed.

Government Publications

SOYBEANS: ECONOMIC ANALYSES RELATING TO PROCESSING. *Marketing Research Report No. 35, USDA, 46 pages.* Describes economic studies to determine effect of new processing methods, both to farmers and to the processors.

MARKETING LIQUID SUGAR. *Market Research Report No. 52, USDA, 76 pages. 40 cents.* Discusses possible economics and factors affecting use of liquid sugar by the food industries; potential market estimated to be "less than 50 percent developed."

WAREHOUSE OPERATIONS HANDBOOK. *General Services Administration, April* 1953, 150 pages. 75 cents. Incorporates in one volume essential elements of the various phases of modern warehouse operations; designed as an operating guide and to stimulate improvements.

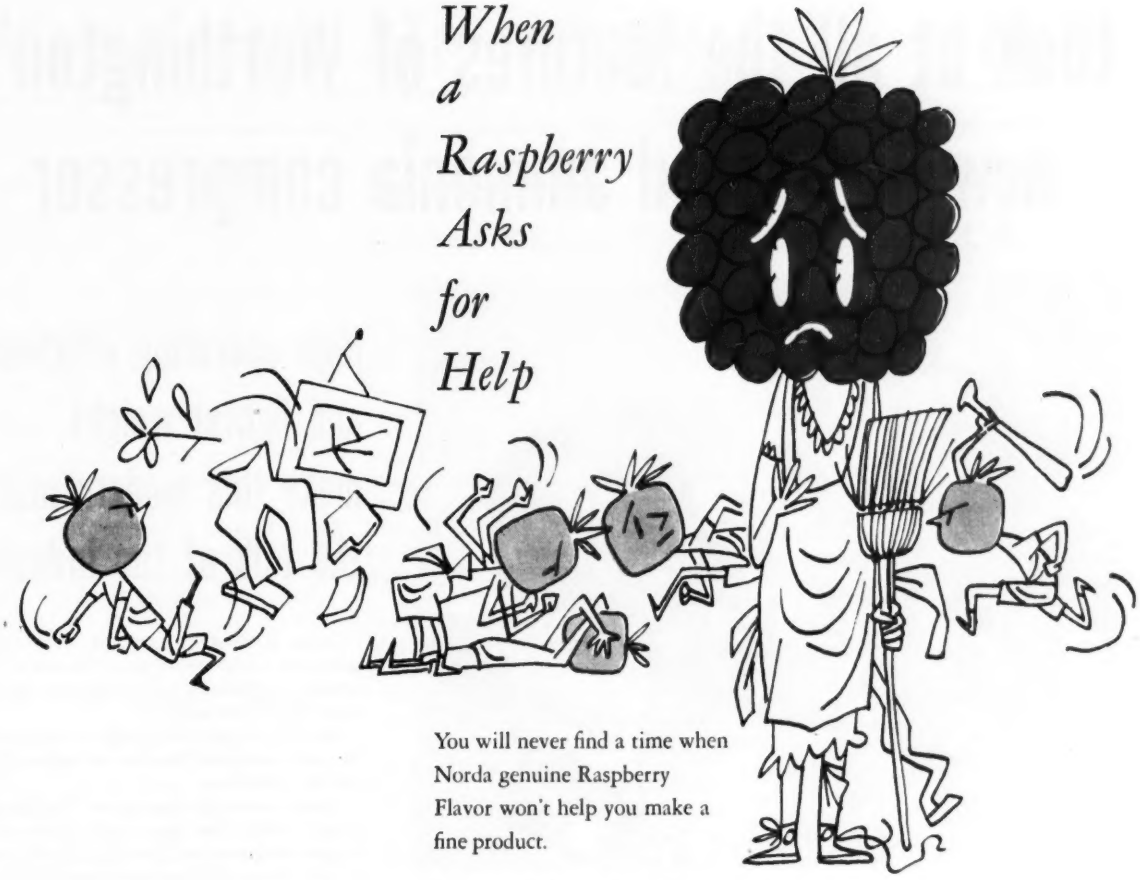
UNITED STATES CENSUS OF AGRICULTURE 1950. A series of volumes and maps, available individually (114 items) or bound together, the prices ranging from 15 cents to $7.50 each.

These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered directly from the Bureau responsible for its issue.

DEMAND AND PRICE STRUCTURE FOR FOOD FATS AND OILS. *Technical Bulletin No. 1068, USDA, 69 pages. 25 cents.* Reports an economic research study which was carried out under the Agricultural Marketing Act.

CANDLING, SIZING, PACKING, AND MATERIALS-HANDLING EQUIPMENT AND METHODS USED IN EGG ASSEMBLY PLANTS. *Marketing Research Report No. 47, USDA, 80 pages. 40 cents.* Reports part of a large research project on layout and design of marketing facilities; a second report is planned as a sequel to this.

When a Raspberry Asks for Help



You will never find a time when Norda genuine Raspberry Flavor won't help you make a fine product.

You may find occasions when cutting costs would be pleasant, if quality could be insured.

—Come to Norda

Why don't you combine Norda imitation Raspberry Flavor, with the genuine natural, to supplement it, "piece it out"? The flavor you get is real raspberry, in taste, richness, all characteristics. It has the ripe raspberry full-bodied strength that's always so popular.

Try this economy. Test free samples of Norda genuine and imitation Raspberry Flavor. Send to Norda today.

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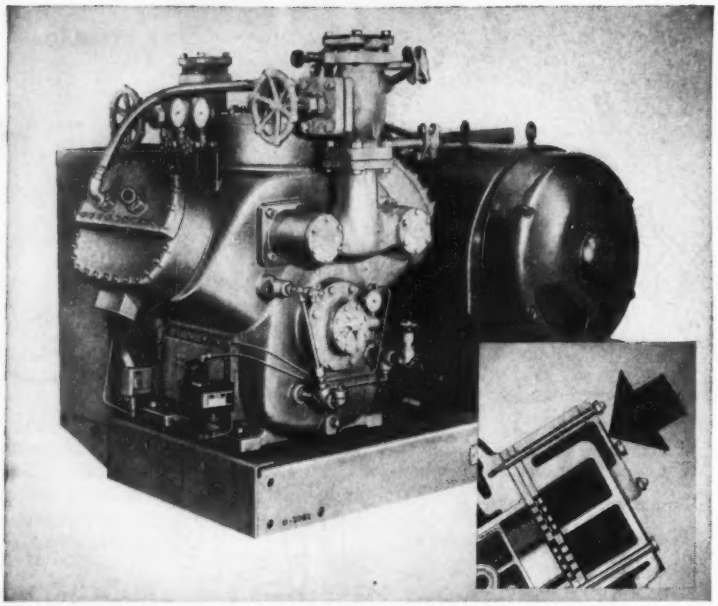
Look at all the features of Worthington's new high-speed ammonia compressor



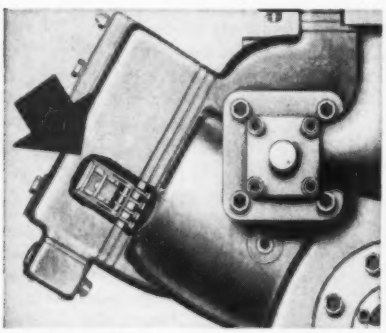
IMPROVED INTERNAL MANIFOLDING—cool suction gas completely surrounds the cylinder walls, providing longer valve life and increased overall efficiency. All passageways between suction discharge and shutoff valves are cast integrally within the crankcase, eliminating outboard fittings. Cross section shows water jacketing on one of the cylinders.

High operating efficiency and lighter weight make this modern unit the talk of the industry

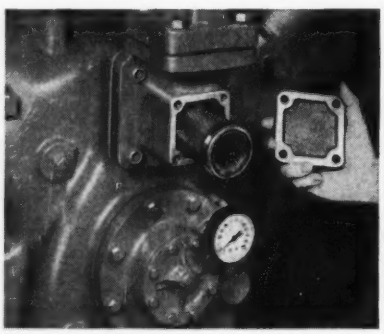
These lightweight, compact Worthington ammonia compressors have the same high operating efficiency and versatility as their lower speed counterparts.

Ranging in capacities from 18 to 150 tons, the new units can be used as high-stage or booster machines.

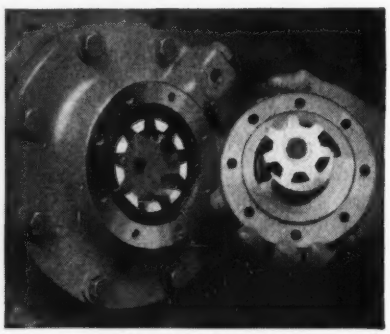
Get in touch with your nearest Worthington district office for more facts about these rugged compressors. Or write to Worthington Corporation, Air Conditioning and Refrigeration Division, Section A.3.56, Holyoke, Mass.



ELECTRIC UNLOADING—a new achievement in variable capacity control. You can start compressor with a normal torque motor; power consumption is automatically balanced against load. Separate unloader units allow easy maintenance . . . no oil or gas pressure lines to worry about.



NEW SUCTION MANIFOLD, with cover plate over suction strainer inlet, allows easy removal of the suction gas strainer for cleaning, without disturbing any of the pipes, valves or other parts. The strainer is unique in that it fits entirely within the crankcase manifold, requiring no additional space.



NEW FORCE-FEED LUBRICATION SYSTEM—full pressure, positive lubrication, regardless of rotation. A new rotary oil pump, driven directly by the crankshaft, eliminates complicated and noisy gear trains. Oil is filtered through a strainer in the crankcase for protection of pump and other moving parts.

A.3.56

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KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

Concentrate Preferred

"More flavor", "Better flavor", "More apple flavor", "More natural flavor"—were some of the terms by which tasters hailed concentrated apple juice during recent tests.

In all, 375 persons compared the concentrate with regular bottled juice in two New York department stores. And 60% preferred the former.

The tested juices were made from a mixture of Jonathan, McIntosh, Stayman-Winesap, and Northern Spy apples.

One part of this mixture was run through an aroma-recovery unit, then concentrated and the aroma added back. The other part was bottled directly.

Find New Growth Factor

Casein, the principal protein of milk, carries an unidentified growth factor, USDA scientists have discovered. They found that chicks from casein-fed hens outgained those from hens on high-protein soybean rations or on low-protein corn diets.

The new factor is different from vitamin B_{12}, normally associated with casein, liver, and cow manure. And it can be transmitted from the hen's diet to the chick.

Egg Storage Life Upped

A process permitting "almost indefinite" storage of eggs is reported to have been patented by a South African engineer.

The eggs are placed in a vacuum chamber, then sealed by an electrically applied coating of aluminum.

Method is a variation of the principle used for depositing hard-wearing materials metals on soft metal surfaces.—*McGraw-Hill World News.*

New Emulsifier Plants

Capacity for supplying mono- and diglycerides and other emulsifiers for the food industry is being boosted by erection of two new plants.

Now under construction by Atlas Powder Co., the larger of these facilities will be a $1,000,000 plant at Memphis, Tenn., while the other, a $350,000 property, is going up at Brantford, Ont. Both will be in operation later this year.

Procurement, Processing and Q.C., Faster Filling Spotlighted by NCA

New government procurement plans, radiation sterilization, enzyme regeneration, container sterilization, detining of cans, and faster filling were among highlight topics discussed by speakers at the recent National Canners Assn. convention in Atlantic City

Procurement Plans for '54 needs of canned fruits and vegetables by the Armed Forces contemplate substitution of competitive negotiation for set-aside and letter contract procedures followed in 1951, '52, and '53.

Plans will be effected by various Market Center offices of the QM Market Center System, with headquarters at 226 W. Jackson Blvd. Chicago 6. Estimated requirements:

CANNED VEGETABLES	Total Weight (1,000 lb.)
Asparagus	3,906
Beans, lima	10,186
Beans, string, snap	24,479
Beets	8,164
Carrots	8,173
Catsup, tomato	12,918
Corn	13,024
Juice, tomato	37,973
Peas, green	25,392
Potatoes, sweet	19,887
Pumpkin	1,849
Puree, tomato	4,710
Spinach	3,878
Tomatoes	52,513
Tomato paste	6,226
Total	233,278
CANNED FRUITS	
Apples	14,988
Applesauce	9,634
Apricots	9,921
Berries	2,546
Cherries, sour	2,939
Cherries, sweet	1,849
Figs	3,456
Fruit cocktail	16,508
Juice, pineapple	18,902
Peaches	22,514
Pears	12,661
Pineapple	13,523
Plums	3,614
Total	133,055

Not incl. 28,350,000 lb. pineapple juice

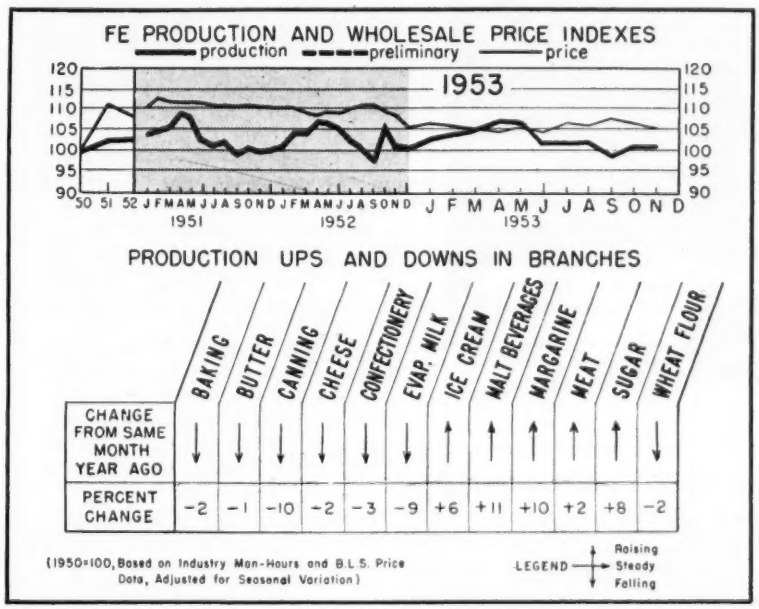
Radiation Sterilization (C. B. Pratt and O. F. Ecklund, American Can Co.): Samples of meat sterilized with gamma radiation developed objectionable taste characteristics that were not removed by additional treatments or in storage.

This off-flavor in beef was reduced, but not entirely eliminated, by irradiating while frozen; or, to a lesser extent, by addition of sodium ascorbate. But these treatments failed with pork.

Factors affecting the sterilization requirements were type and concentration of contaminating organisms, nature of medium in which organisms are contained, and presence of air.

Factors having but slight effect are pH of medium containing organisms, and presence of free radical acceptor, sodium ascorbate.

Enzyme Regeneration (R. B. Guyer and J. W. Holmquist, Continental Can Co.): Observations of peroxidase



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Save space now wasted on foam; cut processing time; eliminate waste and fire hazard of overflowing foam.

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destruction during processing of canned peas clearly show that enzyme regeneration does occur, even after sufficient heat has been applied to destroy microorganisms effectively. The studies indicate that thermal inactivation of enzymes in processed peas does not follow the same type curve as that for destruction of bacteria.

Where enzyme regeneration problems exist, time-temperature relationship for high temperature processes must be clearly established for complete enzyme destruction to insure flavor stability. Longer times of heating must be used.

Fortunately, an inherent advantage of HTST processing is that this additional amount of heat may be applied in a very short time.

Container Sterilization (C. P. Collier and C. T. Townsend, Western Branch Lab., NCA): Based on thermal death-time studies and on commercial experience, a minimum heat treatment of can surfaces after closure equivalent to F_{250} of at least 20 apparently is necessary with acid foods.

To attain at least this lethality calls for "pre-sterilized" products handled by hot fill-hold-cool procedures:

For tomato and fruit juices, fruit nectars packed in 12-oz. or larger cans, a 3-min. hold between sealing and water cooling is adequate when: (1) Temperature of product at filler is 200 deg. F.; (2) cans are not washed immediately after closure; (3) cans are rolled, rocked, or inverted during part of holding period; and (4) cans are not placed on wet solid metal plates or wet rubber belts, and are not exposed to strong, cool air currents.

For highly viscous products such as tomato paste and fruit concentrates packed in cans larger than 303x406, directions are to fill product either at: (1) 195 deg. F. or above and wash with water above 160 F. after closing; pass through water or steam cooker at 180 F. or higher for 2 min., then water cool; (2) 200 F. and wash with 160 F. water after closing; then roll cans to rid excess water and hold for 5 min. in enclosed tunnel or 8 min. in the open, protected from air currents; and (3) 195 F. or above with 160 F. wash after closing; roll cans, then invert on wooden pallets and air cool.

Detinning of Cans (E. A. Mudra and R. Royce, American Can Co.): Alkaline carryover to retorts from improperly operated boilers may remove tin, enamel, or lithography, or form unsightly white deposits on outside of cans during processing.

Detinning is more serious on electrolytic cans because initial coating overlying the iron-tin alloy layer is thinner than on hot-dipped plate.

In addition to detinning when cans are directly contacted by steam carrying entrained alkali, instances may occur in which it is confined to cans submerged in condensate collecting in bottom of retort. This frequently occurs with No. 10 cans where a water cushion is provided as an aid in pressure cooling.

Somewhat related is problem of discoloration where cans contact iron retort crates, trucks, or baskets. This discoloration, sometimes called "steam burn," may appear as a yellow, brown, or purple stain on can surfaces.

Investigation with cans processed in wire trays, revealed discoloration was electro-chemical. A galvanic cell was formed by the two dissimilar metals (tin from container, iron from tray) in presence of electrolyte (alkaline carryover, or scale on tray). Degree of staining appeared directly related to amount of alkaline entrainment in steam.

Usual approach to correction: (1) Reduce alkalinity of boiler water, and (2) reduce, as far as possible, carryover of boiler water in steam. Often, however, condition is one of overloaded boilers, and temporary control measures may be expected to produce only temporary relief.

Faster Filling (H. I. Edwards, Pfaudler Co., Rochester, N. Y.): This speaker predicted that baby foods and juice concentrates commonly will be packed at up to 1,000 containers per minute by 1956.

He cited his own company's current project for a leading manufacturer—a piston-type baby food filler designed for a speed of 800 containers per minute, or 1 ton of food every 8 min. And in event of later acceleration to the 1,000 rate, it would mean over 16 containers a second.

Can companies, he said, are building special closing units for use with the new filler.

"Are you the fellow who's selling folding cartons?"

Weigh D of C Services

Study to define the area in which the Department of Commerce can best serve the food industry is being launched by an industry "task force." This cooperative action was decided upon at the conference called last month by the Business & Defense Services Administration, USDC.

Executives of 26 leading food companies and food trade associations were in the group, which moved to use findings of the investigation in shaping recommendations aiming to improve services to the industry by this Department, with activities of USDA in practical working relation.

New Butter Use

Sizable reduction in stocks of government-owned butter could result from varied experiments now being conducted by several large chocolate processors.

As an instance, Wilbur Suchard Chocolate Co., Lititz, Pa., has just purchased 30,000 lb. of the USDA butter for experimental use as an extender for cocoa butter.

Hors d'Oeuvres

▶ 'Tis the Golden Anniversary of the tea bag. And coffee prices are celebrating it.

▶ **Researchers are looking for the appetite "factor." They want to know why people make pigs of themselves.**

▶ With Swanson's quick-frozen dinners, you heat, eat, and throw the plate away. Now food manufacturers are really getting somewhere!

▶ **"The Golden Ten" companies—which have not cut a dividend since 1929—include American Chicle, Beech-Nut, and General Mills. Food company stockholders eat regularly.**

▶ Soaking meats in wine makes them more tender—just as with most people.

▶ **Suchard is experimenting with surplus butter as a cocoa butter extender, at 25c. a pound. Alas, butter finds too late that what goes too high comes down too hard.**

▶ In Australia, cabbage has been crossed with cauliflower to produce "chloriflower." Now we can have "flowerkraut."

▶ **Directions for making cocktails have been recorded on long-playing disks. What next? A Crosby cookbook?**

▶ Homemakers are surprisingly light eaters—only 1,780 calories a day. Don't like their own cooking?

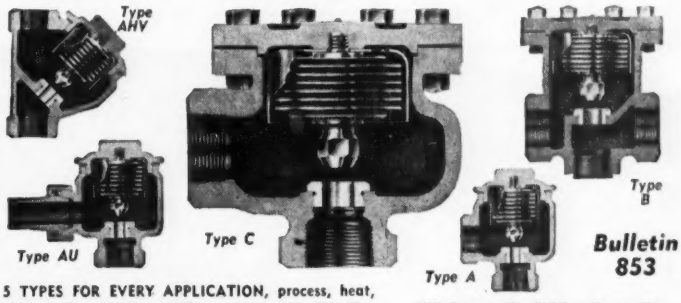
▶ **Pork packers propose that official grade names be changed from Choice No. 1, Choice No. 2, and Choice No. 3 to "Meat", "Good," and "Overfat." Nice bit of de-colossalizing.**

In This Plant Nicholson Traps

SAVED 10% IN STEAM COSTS

Chief Engineer H.F.D. stated, after Nicholsons replaced mechanical traps in his plant: "Saving in steam waste cut our fuel cost at least 10%. Yet application temperatures were up 30°-40°. And relief of all air binding effected faster warm-up."

Operate on lowest temperature differential; 2 to 6 times average drainage capacity; maximum air venting. For other advanced Nicholson features send for Bulletin 853.



Bulletin 853

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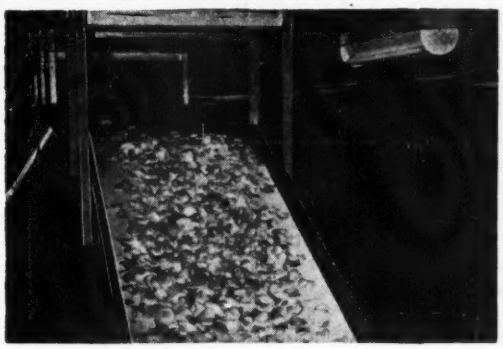

SUPRENE BELTING...

Likes Having Its Face Washed!

Wherever cleanliness is a factor . . . in cleaning fruits and vegetables, in the manufacture of biscuits, crackers, bread, candy and cheese . . . *sanitary, Suprene Belting is always in demand!* That's because it's so easy to keep clean! . . . washes like new with steam or hot water.

A superior cotton duck belt, Neoprene impregnated, it is highly resistant to the corrosive action of fats, greases and fruit acids. Odorless, tasteless and waterproof, Suprene Belting offers years of safe and sanitary conveyance. Available in a variety of plies and four styles to meet all your food handling requirements. Send for Bulletin 20.

Victor

Batata & Textile Belting Co.

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Beckman — pioneer of virtually every major advancement in pH equipment — now presents a significant new development in industrial pH instruments — the new Model W Industrial pH Meter.

This new industrial pH Meter takes advantage of modern electronic engineering, using miniature and subminiature tubes and printed circuits. It is only one-quarter the size of conventional pH instruments... and is designed to save maintenance costs by sturdy, moisture-proof construction. The instrument circuit is of a completely new Unitized design — made in three separate plug-in sections, any of which can be interchanged in the field to avoid downtime.

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Signal to recorder accurate within ± 0.02 pH.

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Designed for high humidity and outside exposure conditions.

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Can be used with air purge in explosive atmospheres. Heavy cast iron case available.

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Freezers Standardizing On Package Weights

Voluntary net-weight standards for retail packages of frozen vegetables and frozen peaches, strawberries, and raspberries are being developed.

Working with the Department of Commerce, a committee of National Assn. of Frozen Food Packers prepared a list of suggested standards. And a proposed simplified-practice recommendation now has been submitted to packers and distributors for consideration.

Purpose of proposed standards is (1) to avoid confusion on the part of consumers as to quantities in the packages and (2) to effect economies in packing and distributing the frozen products.

After this particular standardization project is completed, it is expected that other types of frozen packages will be studied.

Here is a list of the recommended package net weights:

Frozen Product	Net Wt. Contents (Oz.)
Vegetables:	
Asparagus	10
Broccoli	10
Brussels sprouts	10
Cauliflower	10
Leafy greens (spinach, kale, etc.)	12
Corn-on-cob	2 ears
Cut corn	10
Green beans	10
Lima beans	10
Mixed vegetables	10
Okra	10
Peas	10
Peas and carrots	10
French fried potatoes	9
Squash	16
Succotash	10
Fruits:	
Peaches	12
Raspberries	10
Strawberries:	
Whole	16
Sliced	10 or 16

Exceptions on Coumarin

Initially, no exceptions greeted the tentative order of Nov. 3 calling for amendment of the cacao products standard of identity to omit coumarin (FE Jan., p. 227).

But—the picture changed abruptly on Dec. 28 when three exceptions were filed by John G. Adams, president of Manufacturing Laboratories, Inc., Austin, Tex. The declarations came in a letter to the Secretary of Health, Education & Welfare.

Specifically, the exceptions (1) disputed evidence purporting to show coumarin as unsuitable for use in foods, considering the very low concentrations employed, (2) disagreed with the conclusion that coumarin should be removed as an optional ingredient, and (3) declared the findings were misleading and, further, only based on the report of one privately-owned laboratory.

Guardian OF PURITY AND FLAVOR

GUARDIAN of purity and flavor in liquid food transmission, Tygon flexible-plastic hose (B-44-3) is chemically inert, non-toxic, non-contaminating. It is completely free from any tendency to impart taste or odor in transmitting all fluid foods — even the most delicate liquids or semi-solids.

Crystal clear, Tygon provides visual protection of solution purity by spotlighting unwanted foreign material or stoppages in the line. Tygon's mirror-smooth walls, free from checks or fissures, limit bacterial growth; Tygon can be flush cleaned with hot water or chemical cleaners or detergents, or if necessary can be steam sterilized.

Flexible as a piece of string, light-weight, strong and abrasion-resistant, Tygon is easily installed, dismantled, and reassembled — either for cleaning purposes or for quick processing "set-ups." Tygon B-44-3 is available in continuous lengths and in a wide range of bore sizes up to 2"; and for higher pressure use, is made with an outer-braid stainless-steel reinforcement for pressures up to 300 psi.

Bulletin T-77R gives complete technical data on Tygon, the flexible plastic hose which safeguards purity and flavor at money-saving cost. Write for your free copy today.

U.S. STONEWARE

Plastics and Synthetics Division

318-D

For more information, use coupon on page 179.

for lower cost control of moderately **Corrosive** fluids

Fig. 2651-A Gate

JENKINS

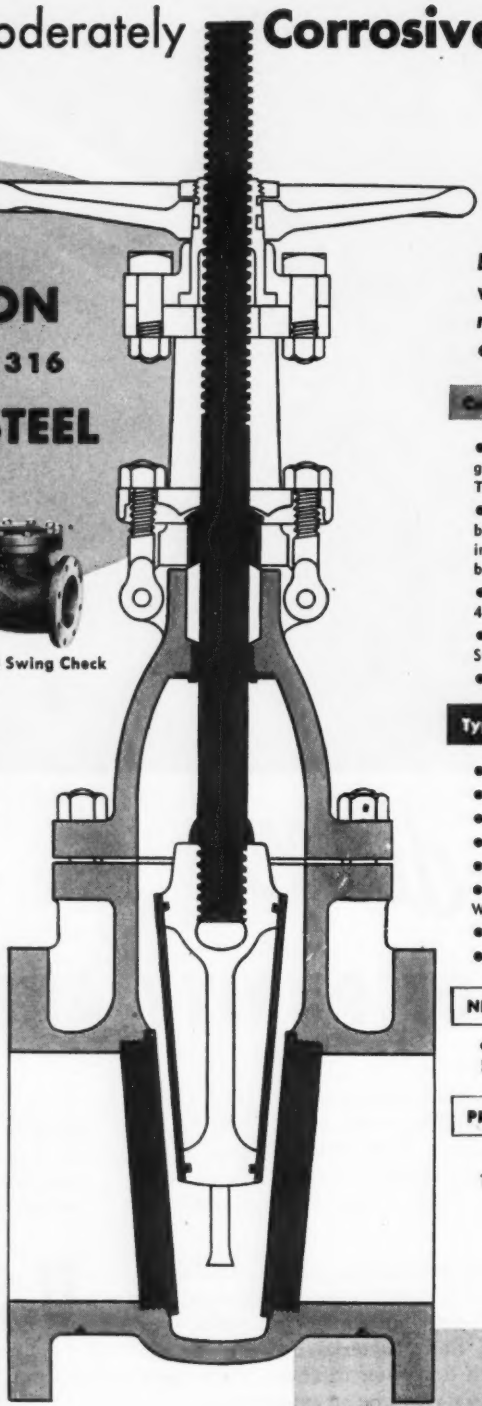
NICKEL IRON

Valves with Type 316

STAINLESS STEEL

Trim

Fig. 2624 Swing Check



Every part in contact with fluid is the right metal to block corrosion and beat wear.

Cast NICKEL IRON

- **BODIES** Heavy duty, dimensioned for greater resistance to wear and abuse. Through port design in Gate Valves.
- **BONNET** Rugged construction, like body. Swing-type gland bolts. Screwed-in back-seating bushing. Deep stuffing box.
- **YOKE** Integral with bonnet in 2" to 4" sizes.
- **WEDGE** In 10" to 24" sizes, with Stainless Steel Wedge Rings.
- **COVER** In Check Valve.

Type 316 STAINLESS STEEL

- SPINDLE
- GLAND
- BONNET BUSHING
- SPINDLE RING
- WEDGE PIN
- WEDGE RINGS Rolled into Nickel Iron Wedge in 10" to 24" sizes.
- SEAT RINGS
- DISC and HANGER in Check Valve

NI-RESIST Type No. 2

- WEDGE of I-beam structure is solid NI-RESIST in 2" to 8" sizes.

PRESSURE RATINGS

2" to 12"—200 lbs. O.W.G.
14" to 24"—150 lbs. O.W.G.

This combination provides corrosion resistance well above the moderate need in many processing services with an investment well below that for all-stainless steel valves.

Designed primarily for the chemical process industries, they are recommended for control of mildly corrosive liquids with minimum quantities of mineral acids, such as creosote in wood treatment, and many liquids carried in petroleum processing.

A major use is in pulp and paper processing, particularly in lines serving the digester, and in the chemical recovery cycle. Service records in lines carrying the valve-punishing "black liquor" give Jenkins Nickel Iron Valves top performance rating.

Jenkins *extra value* construction throughout. Get details — compare. See why they stretch your valve investment dollar — with longer service life, lower maintenance cost.

GET COMPLETE SPECIFICATIONS from your Jenkins Valve Distributor, or write: Jenkins Bros., 100 Park Ave., New York 17. Ask for Bulletin 118.

JENKINS
LOOK FOR THE DIAMOND MARK
VALVES
SINCE 1864 TRADE JENKINS MARK
Jenkins Bros

Milk Concentrate Popular, Oleo, Too, On Farms

More than 700 central Illinois farm families receive weekly deliveries of 3:1 concentrated whole milk.

They not only like the convenience of home delivery, but also are really enthusiastic about the product—actually prefer its taste to that of Grade A pasteurized milk.

This project, operated by Prairie Farms Creamery, Bloomington, Ill., has made steady gains in a 6-month test.

Further, it has been borne out that "farmers seem to have no qualms about selling cream and buying margarine."

The substantiation came in a recent survey of 222 food stores in towns of 10,000 or less population.

When asked "What percent of your oleomargarine sales are made to farm families," 17 storekeepers said "at least 75%," while another 100 said "50 to 100%."

Significance of the figures are indicated by the fact that most of the stores have more "in-town" than "farm" customers.

Willkie Heads Canners

New National Canners Assn. president is E. E. Willkie, head of Pacific American Fisheries, Inc., Bellingham, Wash. He succeeds, Louis Ratzesberger, Jr., president of the Illinois Canning Co., Hoopeston, Ill.

NCA's '54 elections, held at the recent convention in Atlantic City, also saw the naming of George B. Morrill, Jr., of Burnham & Morrill Co., Portland, Ore., as vice-president. Carlos Campbell, of Washington, D. C., continues as executive secretary-treasurer.

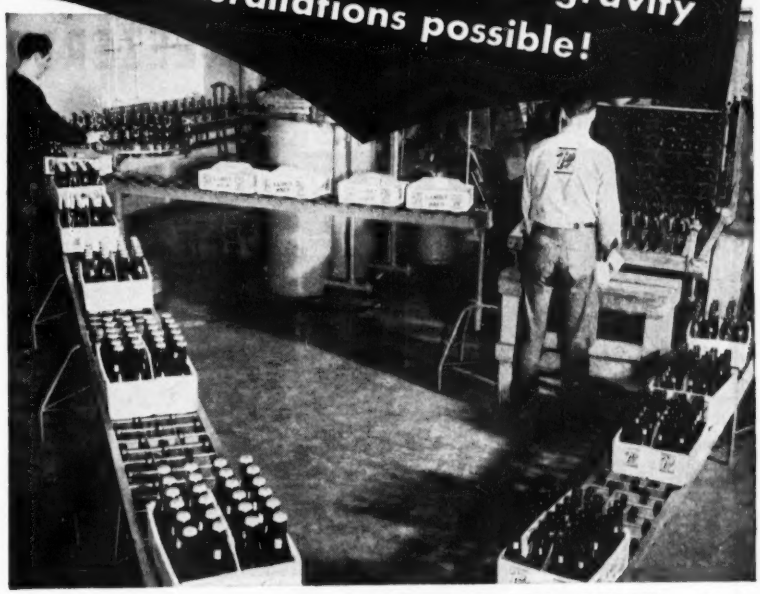
Mr. Willkie, a brother of the late Wendell Willkie, entered the canning business in 1923. Prior to heading PAF he was a vice-president of Libby McNeill & Libby in Chicago.

Trades Pick Funkhouser

Heading the Canning Machinery & Supplies Assn. for '54 is Elmer N. Funkhouser, vice-president of Dewey & Almy Chemical Co., Cambridge, Mass. He succeeds Hal W. Johnston of the Stecher-Traung Lithograph Corp., Rochester, N. Y.

Meeting at the recent canners convention in Atlantic City, CM&SA also elected C. K. Wilson, Food Machinery & Chemical Corp., San Jose, Calif., as vice-president. W. D. Lewis, of Washington, D. C., continues as secretary.

Specify Farquhar Black Velvet
Roll-Free CONVEYORS
for the most economical gravity installations possible!



In this complete handling system, Farquhar Black Velvet ROLL-FREE gravity conveyors first move cases of empties to bottle washing machine. After bottles are washed, filled and capped, they are stacked in the cases, which have now moved to operator at left. The filled cases are then moved out to storage by conveyor, passing over empties moving in to be washed.

ONLY with Farquhar's line of Black Velvet ROLL-FREE gravity conveyors do you get the assurance of longer, trouble-free service that spells real economy through the years! That's because every wheel, roller and bearing in Black Velvet ROLL-FREE conveyors is treated with a special process to resist rust and corrosion . . . to keep moving parts turning smoothly when conventional conveyors fail. This process is the same penetrating treatment that withstands the 24-hour salt spray test as prescribed by government specifications for certain weapons used under the most severe field conditions, so you know it's *got to be good!*

What's more, ROLL-FREE conveyors give you the maximum strength of rigidly cross-braced steel frames . . . yet are light in weight to assure ease of handling. They're available in straight and curved sections, to fit any installation requirement. When you need gravity conveyors, be sure to specify Farquhar Black Velvet ROLL-FREE conveyors. Our engineers will be glad to assist you, at no obligation!

A complete line of standard Farquhar ROLL-FREE conveyors without the Black Velvet treatment is also available.

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FREE! "Roll-Free Gravity Conveyor Folder" —showing Roll-Free line, specifications, and typical installations.

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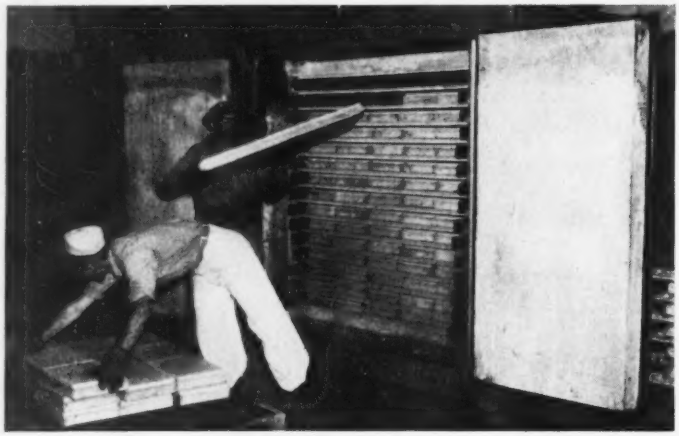

Their high efficiency and speed assure uniformly frozen packages. You need no expensive or expansive machinery which has to first "freeze the air" before your products can start freezing.

Their high production output coupled with simple and economical operations make "Amerios" the first choice of leading food processing plants. They do a better job!

Those who have installed Amerio Freezers continually add additional units as volume expands. You, too, should freeze with "Amerios".

We shall appreciate your inquiry.

Designed For Ammonia Brine or Freon Refrigerant

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Contact Plate Freezers Inc.
Union City, N.J.
"It's the Contacts that Count"

Send For Illustrated Brochure

Frozen Food's Strides And Major Hurdles

Progress-and-problem factors were weighed in forthright sessions at the recent National Frozen Food Convention in New York City. Leading talks are spanned below:

Prices & Distribution (M. K. Spiegl, president, National Assn. of Frozen Food Packers and head of Spiegl Farms, Inc., Salinas, Calif.): To advantage of consumers, prices are averaging 15% under 1947-'49. Frozen vegetables, specifically, cost consumer about 22% less; fruits and juices are down 9%; juice concentrates, alone, are 30% lower.

Meanwhile, output is pushing steadily upward, with '53 volume of all types of frozen foods 10-15% higher than in '52. And more extensive and efficient distribution is moving supplies to consumers. Further, the rise in home freezers to a total of 6,000,000 is a big factor in '53 record or selling some 20% more frozen foods than in preceding year.

Lemon-Product Jump (F. R. Wilcox, assistant general manager, Sunkist Growers, Inc., Los Angeles): The frozen lemon business is enjoying a climb almost similar, percentagewise, to that of frozen orange juice concentrate. After decades of surpluses, entire crops went either to fresh market or juice-product uses last year.

Value & Output: Retail dollar-gage of all commercial frozen foods in '53 is put at $1,200 million—up from $875 million in '52. And output last year is calculated at 3,380 million pounds, as against 2,890 million pounds year before. Cited was Army QM's '53 purchase of nearly 243 million pounds at a cost of $92.5 million.

Processors' Roster: Total of processors now runs to 1,434, up 106 from '52. Breakdown—fruit and vegetable packers, 405; seafood concerns, 404; precooked and prepared frozen foods, 302; meats, 153; poultry, 118; and juice concentrates, 52.

Prepared Frozen Foods (Patsy D'Agostino, president, D'Agostino Bros. Food Markets, N.Y.C.): Staple line for evening up profits can be the prepared frozen products. These items have even greater potential than soft goods.

John E. Tully, president-treasurer, New England Frozen Food Distributors, Watertown, Mass.: Prepared frozen foods have a huge potential. Thus far, only 10% of the population has tried them, with about 2% accounting for most sales.

E. Herbert, "McCall's Magazine," N.Y.C. Frozen pies may outmode the home-baked variety, just as commercial ice cream supplanted the home-

freezer kind. "Pies we don't have time to make ourselves, lasagne in 30 min. with no effort, French fried products without a fryer, turkey dinners one at a time—these are really desirable features." But she urged more complete instructions for use, better packages, more realistic specifications of portions.

Profit Picture (Howard Kruger, merchandising manager, canned and frozen foods, The Kroger Co., Cincinnati): Volume has grown rapidly in the past, and now today frozen products rank 6th in dollar profit, as against 9th in dollar volume among 48 different food items handled by Kroger.

Shipping Factors (B. M. Angell, vice-president, Stokely Foods, Inc., Indianapolis): Shipments of frozen products result in the lowest number of claims against railroads, in comparison with all other foods.

R. V. Harron, eastern traffic manager, General Foods Corp., N.Y.C. Railroads should adjust rates to permit frozen foods to be carried at charges similar to those for other processed foods in eastern and certain west-of-Mississippi areas.

L. A. Campbell, traffic manager, Pictsweet Foods, Inc., Mt. Vernon, Wash.: Less than half the West Coast trucks are equipped to maintain suitable zero temperatures. Even so, the situation has improved more in the past year than in previous five years.

Nutrition: Over 10,000 nutritional tests are to be completed this year as the Nutrition Research Program, sponsored by the National Assn. of Frozen Food Packers, progresses at the Wisconsin Alumni Research Foundation. Helpful counsel of nationally known nutrition scientists has contributed in development of $250,000 program. Launched in '53, it will continue through '57.

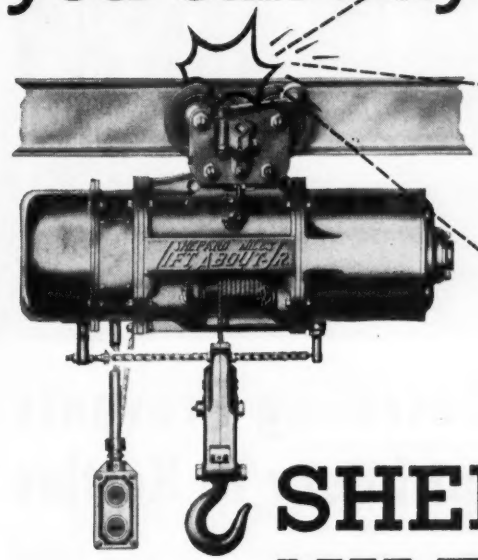
Problem Roundup: Despite notable progress, troublesome problems remain. And these must be solved before field can realize full potential.

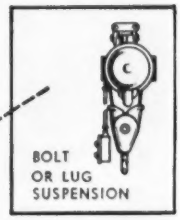
Many pre-processed frozen foods have short shelf life of 3 or 4 months . . . Often when a retailer puts in a new item he must replace another, due to shortage of cabinet space. Cabinet and warehouse capacity both represent bottlenecks . . . Distributors want more profit margin . . . It's contended packers don't sufficiently pro-

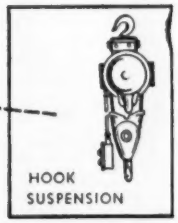
Correction

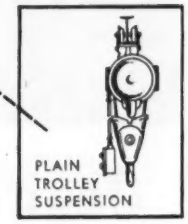
Through typographical error, a table in the article, "Stops Struvite" (FE Dec. '53, p. 67) was headed "Solubility of Struvite, g. per 1,000g." This should have read "g. per 100g."

TOUGHEST *Light-Service* HOIST you can buy!



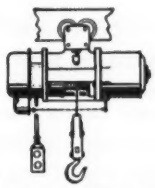




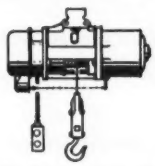


SHEPARD NILES

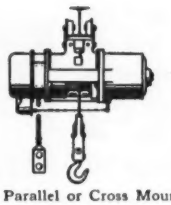
LIFT ABOUT-JR.



500 T Parallel or Cross Mounted.



1000 J Parallel or Cross Mounted.

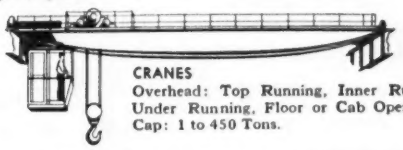


2000 M Parallel or Cross Mounted.

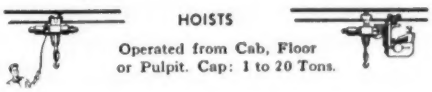
MAIL COUPON!

Hook your load to a Lift About-Jr.—it's the toughest light-service hoist you can buy. This rugged Shepard Niles Hoist is ideal for a hundred-and-one lifting jobs, guarantees you years of dependable service. It offers trouble-free wire rope hoisting, either rope or push-button operation.

Let a Shepard Niles representative tell you about the complete Lift About-Jr. line. He'll help you select the hoist with the right capacity and controls for your job.



CRANES
Overhead: Top Running, Inner Running, Under Running, Floor or Cab Operated. Cap: 1 to 450 Tons.



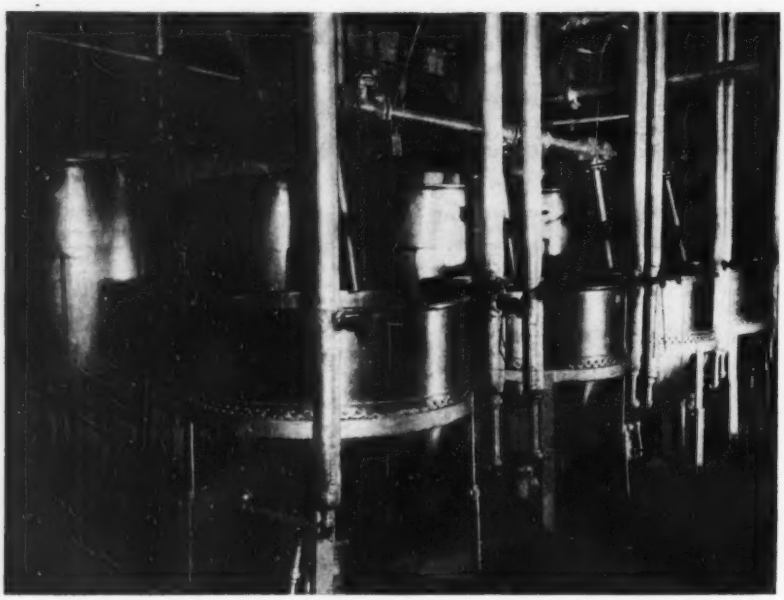
HOISTS
Operated from Cab, Floor or Pulpit. Cap: 1 to 20 Tons.

SHEPARD NILES Crane and Hoist Corporation
1246 Schuyler Ave., Montour Falls, N.Y.

( ) *Please send me your new Lift About-Jr. Bulletin.*
( ) *Please have a representative call.*

NAME _____ TITLE _____
COMPANY _____
STREET _____
CITY _____ STATE _____

For more information, use coupon on page 179.



Oakite Descaling Prevents Permanent Injury To Kettles

Plant reports clogged water jackets of blending kettles restored to full operating efficiency by Oakite materials

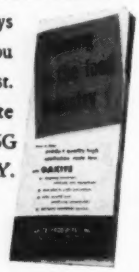
There were 17 of these chocolate blending kettles at this processing plant. And they weren't transferring heat properly. Investigation showed why. Their water jackets were choked with a baked-on algae growth plus ½" wall of lime scale. Oakite was consulted.

A two-pronged attack on this problem was suggested by the Oakite Technical Service Man, based on his wide experience with various tough cleaning jobs in food plants. First, a solution of Oakite Compositions No. 19 and No. 53 to remove the heavy outer black deposits. Then descaling by circulating a solution of lime scale dissolver, Oakite Compound No. 32.

Results: Water jackets cleaned down to the base metal—rated heat transfer regained. And 17 costly kettles saved from permanent injury.

Proving that—in industrial cleaning it always pays to consult Oakite.

Whatever your cleaning problem, you are invited to draw on the wealth of experience Oakite offers. Booklet 7709 tells many more ways Oakite can help you clean better at lower cost. Send for it—Oakite Products, Inc., 26G Rector St., N.Y.6, N.Y.



SPECIALIZED INDUSTRIAL CLEANING

OAKITE

MATERIALS • METHODS • SERVICE

Technical Service Representatives in Principal Cities of U. S. and Canada

mote products . . . Quality is often impaired by failure to use moisture-proof packages . . . Small amounts of meat in pies (as chicken pies) has been criticized.

High Opportunity, however, is evident in the fact that home frozen-food storage space has zoomed to 80 million cubic feet—almost equal to total prewar storage space in packers' plants and refrigerated warehouses.

Tips Vs. Wheat Insects; Cold Called Safeguard

Moisture content and nature of storage facilities are less important than management practices in prevention of insect infection in farm-stored market wheat, according to D. A. Wilbur, Kansas State College entomologist.

In a survey of 700 grain bins on 150 Central Kansas farms, he found wheat of high moisture content stored in loosely constructed granaries surrounded by an abundance of litter remarkably free from infestation. Yet dry wheat, stored in tight graneries with apparently good sanitation, was heavily infected.

Wilbur recommends that market wheat be separated entirely from feed grains, ground feeds, and seed grains; that feed grains be fumigated when stored in the same granary with market wheat; and that storage of wheat in structures which also house animals be discontinued.

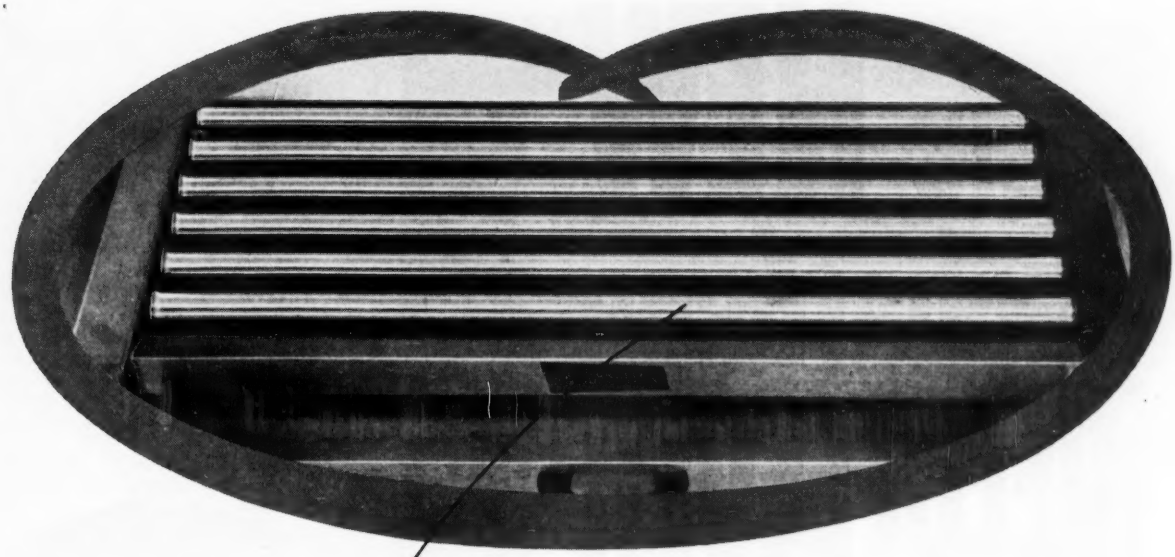
Since few grain-infesting insects hibernate, he concluded that those in isolated granaries do not survive the cold of Kansas winters. However, animals maintain heat in buildings and thus prevent winter sterilization. Feed grains contribute to infestation, he feels, due to carelessness of operators.

Pectin-Grading Progress

Completion of two encouraging sets of collaborative data, based on simplified instructions, is reported in the move to develop a single, standard method of making, and a single method of measuring, a test jelly for pectin-grade evaluation.

Conducted by the National Preservers Assn.'s committee on pectin standardization, the new experiments saw use of a low pH method of jelly preparation and a sag method of measurement. And it was found that about 90% of the committee determined the grade of the same pectin within 5 grade units.

"Our next move," states NPA's E. Everett Meschter, "is to analyse results thus far, and then gradually prove or disprove each item of controversy standing between us and a uniform method."



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plus

SALES APPEAL for YOUR Equipment

The manufacturer of this unique frankfurter roller-grill wanted a roller material that would stay clean and lustrous . . . have complete corrosion resistance . . . insure freedom from contamination . . . uniform heat transfer . . . ease of fabrication and physical properties essential to trouble-free performance under constant use.

He found all these qualities in Carpenter Stainless Tubing . . . and his choice has been solidly confirmed by glowing reports of service satisfaction and increased sales with this grill in food service establishments all over the U.S.A. You see, there's a difference in the quality and uniformity of stainless tubing, and Carpenter makes it.

If you are looking for immediate ways to improve the serviceability of food equipment you build or use, it will pay you to talk with your Carpenter Representative. You can count on him for prompt service on the right tubing for your job plus design-engineering and fabricating assistance.

The Carpenter Steel Company, Alloy Tube Division, Union, N.J.

Branch Offices: Atlanta Chicago Pittsburgh
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"CARSTEELCO"

Carpenter

STAINLESS TUBING & PIPE

← Analysis → ← Tolerance → ← Finish →

- guaranteed on every shipment

For more information, use coupon on page 179.

The NEW Richardson VELOFEEDER

means Better Bulk Feeding for the Food Process Industries

The Richardson Velofeeder easily adjusts to deliver from a trickle to a torrent; ⅛ hp. motor moves 25 tons per hour.

HERE'S WHY—

Higher Output—from 300 to 50,000 lb. per hr. of hard granular materials, or 300 to 30,000 lb. per hour of soft ground materials.

Lower Power Needs—a ⅛ hp. motor powers entire unit—*as inexpensive as running a 100-watt light bulb!*

Smaller Space Needs—only 35 inches long, 17½ inches wide, 19 inches high. Standard vibrating tray 16 inches wide—stainless steel when required.

Easier Control—simple, quick adjustment, over wide operating range (from near 0 to 50 fpm. maximum).

Safer Operation—motor is explosion-proof (Class 2, Group G) where hazardous dust conditions exist. Complete dust enclosure on special application.

Less Vibration—although working frequency is 1850 vibrations per minute, little or no vibration is transmitted to any mounting installation (mounts with only 4 bolts!).

Now widely introduced for the first time, the new Richardson Velofeeder is a vibrating feeder offering *all* the advantages outlined. It is mechanical in operation, requiring negligible power to deliver a very high output rate, unequalled for total efficiency. Of more than 300 now in use, none has failed. Ideally suited to the feeding of sugar, grain, bran, tea, hard candies, cocoa, and similar materials, the Velofeeder offers a wide range of profitable application. Immediate delivery. For complete information on this new development, please write for Data Sheet 5302.

Richardson

MATERIALS HANDLING BY WEIGHT SINCE 1902

RICHARDSON SCALE COMPANY
Clifton, New Jersey

Atlanta • Boston • Buffalo • Chicago • Detroit • Houston
Minneapolis • New York • Omaha • Philadelphia
Pittsburgh • San Francisco • Wichita • Montreal • Toronto

For more information, use coupon on page 179.

Briefly . . .

● RINDLESS Swiss cheese manufacture under a special process has been confirmed as an exclusive right of Kraft Foods Co. in a recent Wisconsin federal-court patent-validity decision. The State had fought to make the process available to all Wisconsin producers, several of whom were defendants.

● A FOOD INDUSTRY DIVISION has been formed by Atlas Powder Co., Wilmington, Dela., through realignment of research and sales groups of chemicals department. Headed by William Hays, assistant to general manager, division will specialize on needs of processors.

● FRENCH IMPORTS of food-industry materials and equipment from the U. S. have been given the green light through France's new exclusive earmarking of credits.—*McGraw-Hill World News (per Reuters)*.

● CANS FOR BEER AND ALE climbed to an all-time-record U. S. volume in '53—6,250,000,000—reports President William Stolk of American Can Co. That's nearly 1 out of every 6 cans that were made.

● SENSORY PANEL TESTING will be taught in a 10-week course (Mar. 15-May 24) at New York U., N. Y. C. Under Jack K. Krum, research chemist, National Biscuit Co., work will cover such topics as test systems, panel formation, the flavor-profile technique, procedures and interpretation, and consumer preference.

● REFRIGERATED WAREHOUSE capacity currently is rising at the rate of 7 million cu. ft. a year, reports the Chamber of Commerce of the U. S. The 100 million cu. ft. of 1905 has now expanded to 450 million cu. ft.

Russian Program Pushing Food Plant Mechanization

In an effort to boost its lagging food production, the USSR has now decreed "an increase in the output of high-efficiency machinery and automatic equipment for securing the mechanization and automatization of food production processes as rapidly as possible."

As published in *Izvestia*, the order reads:

"It will be considered a principal aim of the Ministry of Machine Building during 1954–1955 to manufacture the most modern and highly-productive equipment for processing food products: Automatic lines for fish boning, canning, and sealing; conveyor belts for handling slaughtered livestock; automatic equipment for making sausage products; automatic packaging and wrapping machines; lines for tin can production; new equipment for the sugar industry; and mass pro-

Fast, Automatic Shower Bath for Carrots

● Where carrots are produced and marketed in huge volume, growers have developed an automatic bath-spray washer unit. Carrots are spread on a Cyclone Equalized, Flat Wire or Spiral Woven Belt and carried first through a tank of water, then under automatic sprays. As carrots reach the end of spray unit, skilled workers—on either side of the belt—rapidly gather and pack them.

The variety of food processing operations which can be improved, or speeded up with Cyclone Conveyor Belts is almost unlimited. Call on our experienced engineers. Without obligation they'll be glad to tell you how you can best use a Cyclone Conveyor Belt in your food plant. And write Dept. H-34 for Catalog #5.

U·S·S CYCLONE METAL CONVEYOR BELTS

CYCLONE FENCE DEPARTMENT
AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION
WAUKEGAN, ILLINOIS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

UNITED STATES STEEL

heart of the strainer

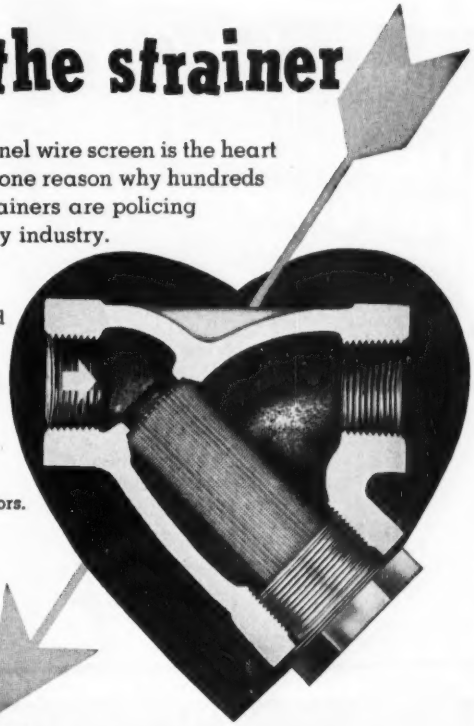
A high-grade, woven Monel wire screen is the heart of the Yarway Strainer—one reason why hundreds of thousands of these strainers are policing pipe lines in nearly every industry.

OTHER REASONS—

- cadmium plated bodies and screen caps
- straight threads, machined faces and spark-plug-type gaskets on screen caps
- ten sizes from ¼" to 3"

Sold by 216 industrial distributors.
Write for Bulletin S-203.

YARNALL-WARING CO.
127 Mermaid Ave.
Philadelphia 18, Pa.



YARWAY STRAINERS

For more information, use coupon on page 179.

AUTO-LITE

TEMPERATURE RECORDING...

Newly designed, Model "1000" Auto-Lite Recorder gives permanent proof of temperature behavior. • 6" clear reading chart; various standard ranges from minus 40°F. to plus 550°F. • 3 standard types; choice of 24-hr. or 7-day cycle. • Electric or mechanical chart drive. • With capillary tubing for remote reading. Priced from $49.50.

Send for new catalog describing many styles of Auto-Lite temperature Recorders and Indicators.

Model "1000"

THE ELECTRIC AUTO-LITE COMPANY
INSTRUMENT AND GAUGE DIVISION
TOLEDO 1, OHIO
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TEMPERATURE RECORDERS

Tune in "SUSPENSE!"...CBS Radio Mondays... CBS Television Tuesdays

THERE ARE Filpaco Stainless Steel TANKS For YOUR Processing

STANDARD · SPECIAL · ALL TYPES

Your inquiry will receive immediate attention.

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Get the right tank . . . we maintain stock or fabricate to special designs for your particular need.

Any size . . . any capacity up to 3000 gallons. Horizontal, vertical, rectangular, with side, bottom or top entering agitators.

Also jacketed construction for heating or cooling; insulated.

Accessories: level gauges, thermometers, special covers, special fittings, etc.

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THE FILTER PAPER COMPANY
2450 S. MICHIGAN AVENUE, CHICAGO, ILLINOIS

Schedule of Events

March

1–5—American Bottlers of Carbonated Beverages, plant training course; Hotel Lafayette, Washington, D. C.

April

2–3—Second Pacific Northwest Conference on Quality Control, American Society for Quality Control; University of Washington, Seattle.

5–8—National Packaging Exposition; Atlantic City, N. J.

25–29—National Refrigerated Warehouse Assn.; Boca Raton, Fla.

26–28—Pacific Northwest Bakers Conference; Multnomah Hotel, Portland, Ore.

29–30—Pennsylvania Manufacturing Confectioners' Assn., annual production conference; Little Theatre, Franklin & Marshall College, Lancaster, Pa.

May

2–5—National Fisheries Institute; Hotel Cleveland, Cleveland.

16–19—U. S. Wholesale Grocers' Assn., convention-exhibit; St. Louis.

16–19—Flavoring Extract Manufacturers' Assn. of U. S., annual convention; Hotel Biltmore, New York City.

17–19—Grocery Manufacturers of America, mid-year meeting; Boca Raton Hotel, Boca Raton, Fla.

17–19—Millers National Federation; Edgewater Beach Hotel, Chicago.

23–27—American Assn. of Cereal Chemists, annual meeting; Cosmopolitan Hotel, Denver, Colo.

23–27—Assn. of Operative Millers, technical conference; Hotel Sherman, Chicago.

30–J6—International Congress of Agricultural & Food Industries; Madrid, Spain.

duction and automatic lines for making butter, bread, rolls, and macaroni products.

Some 530 million rubles (about $132,000,000 at the inflated official rate of exchange) would be expended for new equipment in 1954 and 800 million rubles ($200,000,000) in 1955. Further, up to 1,100 million rubles ($275,000,000) would go into a 1954–56 program for upping capacity of plants making food-industry machinery. — *McGraw-Hill World News.*

SOMETHING TO LOOK FORWARD TO

Lined up for coming issues of FE are a host of timely articles that will help you on your job. Here are a few samples:

How Top-Flight Processor Keeps Plant Clean
Speeding Production by Checking Packaging Materials
Using Heat and Refrigeration Efficiently
Handling Materials Faster, With Less Labor
Planning Ahead for Plant Modernization

FE's editors are traveling far and wide to bring to you each month a big bundle of valuable new information and ideas from all parts of the industry.—*The Editors*

PROVED RESULTS

COOKED SAUSAGE PRODUCTS HAVE BETTER CURE-COLOR ... SMOKEHOUSE TIME IS REDUCED WITH

CEBICURE

(MERCK ASCORBIC ACID)

YOU'RE SURE WITH CEBICURE

CEBICURE is the Ascorbic Acid developed by the Merck Research Laboratories specifically for curing meats. Because of its special particle size, CEBICURE is free-flowing and dissolves rapidly in cold water. CEBICURE is supplied in convenient avoirdupois packages. It is shipped with transportation prepaid from Atlanta, Ga.; Buffalo, N. Y.; Chicago, Ill.; Dallas, Texas; Los Angeles, Calif., Rahway, N. J.; St. Louis, Mo., Seattle, Wash.

See the difference CEBICURE can make in curing cooked sausage products. Establish CEBICURE as a standard curing ingredient.

From a sales standpoint, CEBICURE gives your products more appetizing color—increased eye appeal—and protection against color-fading.

Send for informative bulletin describing preparation of salt solutions with added Ascorbic Acid.

Use of Ascorbic Acid in cooked sausage products is approved by B. A. I.

Under the name "Cebitate" Merck also offers Sodium Ascorbate especially for use in curing meat.

Research and Production for the Nation's Health

MERCK & CO., INC.
Manufacturing Chemists
RAHWAY, NEW JERSEY

For more information, use coupon on page 179.

NEW

Add-a-Unit Automatic Retort Controller!

...can be inexpensively adapted to any type of cook ...for any degree of automation

Here's a new high in control instrument economy . . . a single automatic retort controller that you can readily adapt to *any* changes in your processing.

This versatile Add-a-Unit Control System is based upon the famous Foxboro M/40 Controller, to which various functional components are added . . . depending upon the degree of automation desired.

For example, if your process requires only basic control of temperature, or temperature and pressure, you need only install the M/40. If you change your process and need more completely automatic control, you add a sub-panel. This is designed so that you can adapt it to any program you wish . . . merely by adding simple, inexpensive control "units".

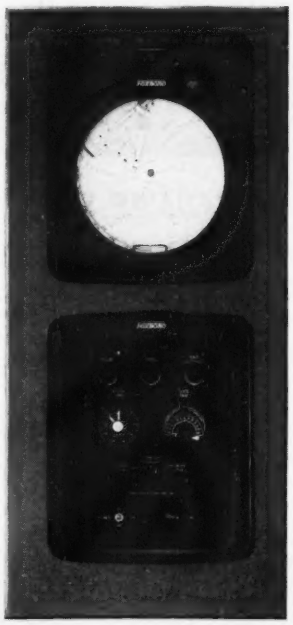
Write for complete information on this revolutionary new Add-a-Unit Controller — the only all-in-one automatic retort controller on the market. A demonstration can be arranged.

Start with this basic instrument . . . add control functions as needed

A For simple automatic control of temperature, or temperature and pressure, install a Foxboro M/40 Retort Controller . . . basic unit of Add-a-Unit Control.

B When you need it, install Add-a-Unit Sub-panel for *Automatic* control of as many of these functions as you require:

- *time of cook*
- *start of cooling*
- *time of cooling*
- *venting*
- *draining*



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Instrumentation

The Foxboro Company, 303 Neponset Avenue, Foxboro, Massachusetts, U.S.A.

FACTORIES IN THE UNITED STATES, CANADA AND ENGLAND

Maintenance "Know-How"

—*Continued from page 68*

supplies. And his department performs most of its own maintenance work. In event his men cannot handle a particular project, an order is issued to the maintenance department for additional services.

"Quality of maintenance," continued Malmgren, "is determined by top management and executed by those of us who work directly with the problem." In his opinion, good maintenance pays four ways: (1) maintains original investment; (2) eliminates downtime on production; (3) reduces replacement costs: (4) and maintains high employee morale throughout the company.

Sanitation vs. Mechanical

Speaking on the role of sanitation, J. Lloyd Barron, sanitary engineer, National Biscuit Co., New York City, said:

"If, as a fundamental of organization, it is agreed that it is not good business to combine two functions of a different nature within the operating responsibility of one person, then our task is to show that sanitary maintenance is essentially different from mechanical maintenance.

"Having done that, it would be further necessary to demonstrate that a supervisor who thus has two different jobs to do almost invariably places emphasis on the one and slights the other. What is emphasized and what is slighted will depend on his background. There need be no attempt to argue that sanitation is more important than mechanical maintenance, or vice versa. Rather, it is indicated that the ratios of importance of these two functions can vary by industry. Another factor is the super-structure of of management in all its variations of form and dealing with the direct, responsible, and immediate supervision of these two activities."

The differentiation, as drawn by Barron, between mechanical and sanitary maintenance: Major concern of mechanical is to keep machines operating, while sanitary maintenance concerns control of the working environment rather than the mechanical system.

In sanitary maintenance the thoughts and energies are focussed on floors; removal, disposal, and salvage of wastes and refuse; painting of walls, ceilings, and facilities; functioning and sanitary maintenance of personnel, indicating accommodations such as toilets, showers, locker and lounge rooms, cafeterias, drinking fountains, uniforms; preventing insect

cut FOOD HANDLING costs in 1954...

with LA PORTE

SAVES TIME—LABOR MAINTENANCE AND PROTECTS PRODUCTS IN TRANSIT

FLEXIBLE STEEL
CONVEYOR BELTING

The most efficient and economical conveyor belting for Canning, Freezing, Dehydrating, also Packaging and Shipping. No sharp edges to injure workers. No fabric to harbor germs. Will withstand impacts at loading chute, will not stretch, nor creep, weave or jump on pulley stand. Resists heat, cold and acid. The open mesh feature permits the circulation of water, air, steam or heat around products in process and speeds up cleaning with steam gun or scalding water.

Ask your Supplier today. Available in any length and practically any width

LA PORTE MAT & MFG. CO.
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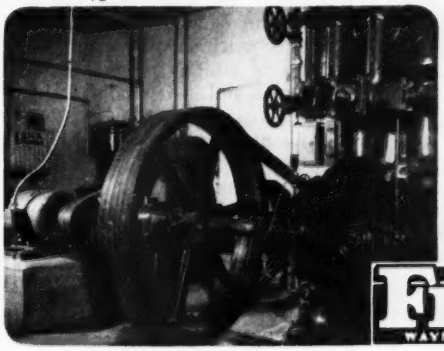
Frick Unit Air Coolers and Compressors Hold 1½ Million Lb. of Frozen Foods at -2°



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FRICK Refrigeration"

Write Sam Vogel and Dave Goldberg, of the Bird Cold Storage at Little Rock, Arkansas. They maintain below-zero temperatures, for holding frozen foods, with four Frick compressors, two of which are shown. Installation by the General Refrigeration Company, local Frick Distributors.

For the most reliable cooling equipment, using either ammonia, Freon or other refrigerant, look to Frick Engineers. Write now for literature and estimates on your refrigerating or air conditioning problems.

DEPENDABLE REFRIGERATION SINCE 1882
FRICK CO.
WAYNESBORO, PENNA. U.S.A.

For more information, use coupon on page 179.

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MERCURY ACTUATED

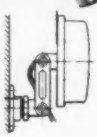
DIAL THERMOMETERS

in 3 types to suit any requirements

Full 4½" dial face. Stem can be placed at any angle and case can be rotated to any readable position.

1 **Rigid Stem Dial Thermometer** tapered bulb, interchangeable with standard industrial thermometer separable socket. (As illustrated above.)

2 **Wall Mounted Dial Thermometer** with flexible connecting armor. Case adjustable to easy reading position.



3 **Flush Mounted Dial Thermometer** for panel mounting with flexible connecting armor.

All three types have a full 4½" dial face.

for accuracy: Mercury actuated . . . Fully Compensated by Invar Compensaton. Guaranteed Accurate 1 scale division.

for angularity: Can be adjusted to most readable position at any angle desired.

for readability: Bold Black Numbers . . . 11" of scale Reading Dial face can always be placed in easiest readable position.

for interchangeability: Always specify "PALMER" Separable sockets as they are interchangeable for Dial or Industrial type Thermometers.

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and rodent infestations; and protecting of sensitive or perishable materials and products against soil and damage.

Added Responsibilities

The speaker then pointed out that in many industries sanitation is not an "ingredient" of the product. But in food processing "sanitation becomes equal if not paramount to mechanical maintenance. Here, outside influence in support of sanitation comes into play, such as agencies enforcing laws and regulations and also the competition in sales and advertising as to quality, safety, and consumer appeal."

In the area of food industry sanitary maintenance, he said, there are brought in "the necessities of machine cleaning, container and utensil washing, bacterial disinfection, and the protection of foods and organic materials against infestation and spoilage. Also, the personnel hygiene and work habits of employees become a critical part of the problem, consequently, the differentiation of sanitation and mechanical maintenance becomes even more pronounced and the range of specialized knowledge required of the sanitation supervisor removes his work still further from the sphere of mechanical supervision."

On how this split works out from a practical standpoint, Barron said: "My company operates one plant of recent design in which departmental cleaning, in addition to all other usual sanitation functions, is performed by the sanitation department. The staff that moves into the plant nightly consists of men who know precisely what their jobs are and who have the tools, materials, techniques, routines, and supervision necessary to work efficiently. One consequence of this arrangement is that mechanical maintenance is able to do its part with less interference and complications because mechanics are working on clean machines and in clean areas. Significant result in this plant is less down-time and less loss of production than in any other similar company bakery."

Another point highlighted by Barron was the important function of sanitation supervision in the evaluation of machinery and equipment in terms of sanitary design, fabrication, materials and installation.

Meat Plant Sanitation

According to V. J. Del Guidice, head of the technical service section, research div., Armour & Company, Chicago, the standards of sanitation should be uniform, and not vary from company to company in the same industry.

"It would," he said, "be desirable for all meat packers to have the same basic standards, which could be established and recommended by an organization such as the American Meat Institute. The bakers, confectioners, dairy, and others should do the same."

In Del Guidice's opinion, responsibilities of enactment of sanitation programs should be clearly defined by management to all operating heads. The director of sanitation should be responsible to a manager who reports directly to the head of the company, or someone who is on the executive staff.

Central vs Area Mechanics

To operators and engineers directing the activities of large food plants, interesting data on central craft maintenance and area craft maintenance mechanics was revealed by Stuart Whitehead, general superintendent of maintenance and construction, Calco Chemical div., American Cyanamid Co., Bound Brook, N. J.

Actual time studies were taken of jobs performed by the central craft maintenance mechanics as well as the area group. Central craft mechanics were found to be unproductive 46.50% of their time. Breakdown of this unproductive time brought out the following major percentages of unproductivity: Procure tools and materials (including walking time), 23.30; waiting for other crafts, 19.60; idle, other crafts working, 19.50; personnel time and smoking, 14.30; miscellaneous 13.90.

A similar study was made of decentralized area mechanics. They were found to be unproductive 25.60% of the time. Breakdown of the unproductive time in percentages in this group: Personnel, 28.10; procurements of maintenance tools and materials, 22.50; miscellaneous 18.30; clarified job assignments, 10.70; clean up job areas, 9.70.

The study revealed that the area system was more effective than the central. Procurement of tools under the central system showed that 10% percent of the craft mechanic's time was spent in procuring tools and materials and walking to and from job sites. Area personnel were already on the job.

Union-Management Views

Interesting points were made by E. G. Balzano, plant engineer, Seiberling Rubber Co., Akron, in his talk on "Problems Met in Handling Maintenance Labor." This entire plant including the maintenance division, works four, 6 hr. shifts per day. Personnel exceeds 1,600 employees and

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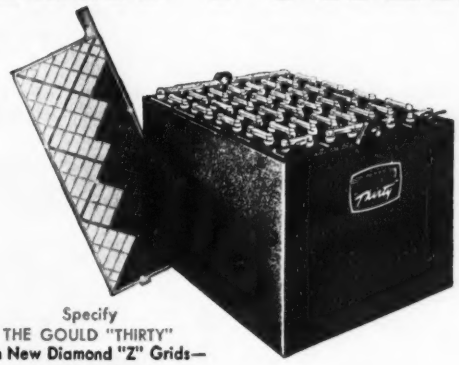

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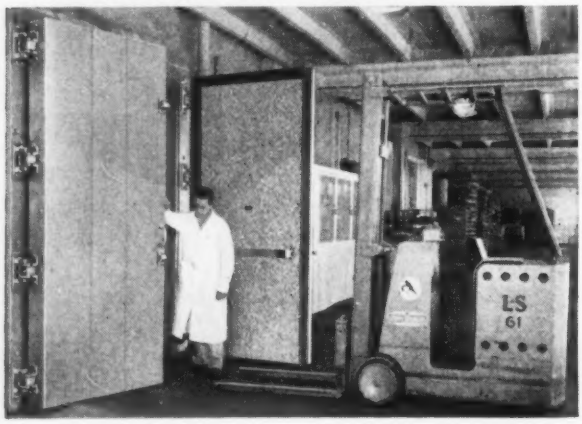

Five Jamison Double Super Freezer Vestibule Doors that open off the loading dock give the clearance needed for fast handling of frozen foods at the Denver Stock Yards Plant of Beatrice Foods.

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includes about 100 maintenance men.

His plant has an industrial union. Basic difference between the trade and industrial union is, according to Balzano, that in a trade union problems are usually confined to a particular craft, while an industrial union deals with multiple problems involving many crafts and trades.

Regarding union regulations and company views:

"Theoretically, the union is opposed to classification of its members on a basis of the work they are qualified to handle. But through no effort of its own, the union has been forced to recognize some classifications and qualifications.

"The union holds to the theory that accomplishment of a specific job assignment is proof of the qualification of a particular tradesman. Classification for pay rating on a time-trial basis is not opposed by the union.

"The company feels that all tradesmen should be classified, using predetermined standards, but with reservations agreed to by the company and the union. Such standards would help improve the quality level of men assigned to maintain the company's capital investment.

"On the other hand, the union insists that such classifications of trades within an industry or plant becomes a tool by which the company can hold pay rates at a lower level. The union also believes that a tradesmen—by virtue of long service—should automatically rate top pay, despite the fact that he may have been doing one daily repetitive task and consequently has not improved his abilities.

"The union believes in maintaining modern equipment and methods so that the company may stay competitive with its industry. But a company cannot stay competitive when the union will not agree to work simplification methods.

"For example, a top-rated journeyman has been required to handle a certain job in the past. Therefore, the union insists that this job should continue to receive top rating, although through improved modern production methods, the work can now be performed by a mechanic helper.

"Actually, the only thing the union will recognize on new methods is time performance.

"The union is definitely opposed to the production worker or a supervisory person performing set-up work which, it says, rightfully comes under the category of maintenance."

Medium Size Plant

Views of a plant engineer on maintenance cost control and budgeting in a plant with 650 employees were given

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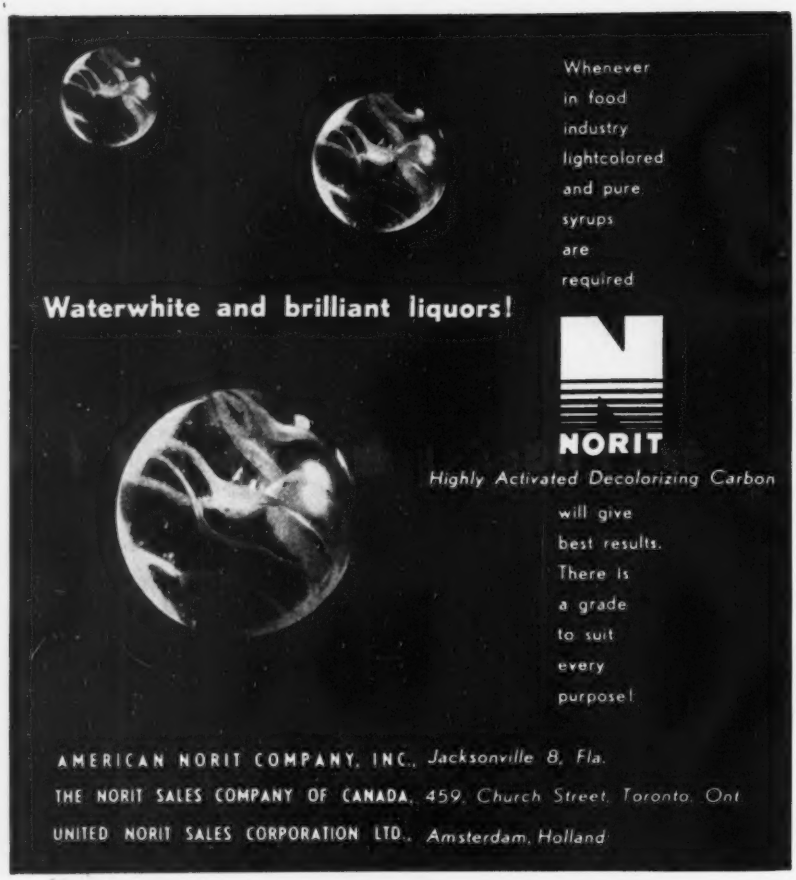
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by J. A. Openshaw, plant engineer, Stanley Home Products, Inc., Easthampston, Mass.

In its cost-control system for maintenance work, the Stanley firm sets up a number of man hours for the power plant, security and custodial work, preventive maintenance, repairmen in various shop areas, electricians, pipe fitters, carpenters, and lubricators. This arrangement, with proper supervision, gives adequate control over day-to-day maintenance expenses, said Openshaw.

In his opinion, if a small company, such as his own, makes this cost control too complicated, then it is bound to fail. Cost of finding the errors may be many times more than monetary savings realized.

"We know how many man-hours we need for janitors, guards, and firemen for our present area of 640,000 sq. ft. of factory and warehousing space. No man-hours will be added to this control without evidence of new or extra work. The same is true with all trades and with area repairmen. The men, however, are not told of cost controls. They are instructed to keep their areas and sections in first-class conditions at all times.

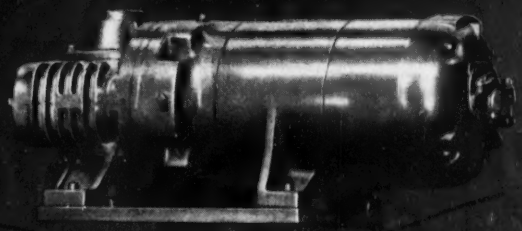
Maintenance supervisors are constantly teaching and training their men to do better work and to devise better systems in their work. Strangely enough, when we do not tell the men to work within certain controls, they very often exceed our expectations and perform in superior fashion. This is not unusual. We found this to be true in other spheres of activity.

"An industrial engineer in a neighboring plant told me of an incident which bears this out. He had a bottling line manned by 18 people. Control of speed of the line was determined by the plant engineering department. This speed was set at the most efficient level, in the opinion of the engineer.

"Trouble was that the workers concerned felt the speed was too fast, and that they were unable to work under conditions thus imposed. One difficulty was that the people on the line knew they had no control over the speed and felt that they were merely adjuncts to the machinery.

"A simple change was made. The device which controlled the rate turned over to the workers. And through a rotation system, a different operator controlled the speed every half-hour. Thus, all eighteen workers felt that they had some control over speed of the line. Each felt that when his turn came, he would slow down the speed to a comfortable pace.

"But after three months of such operation, management was amazed to find that the production was higher



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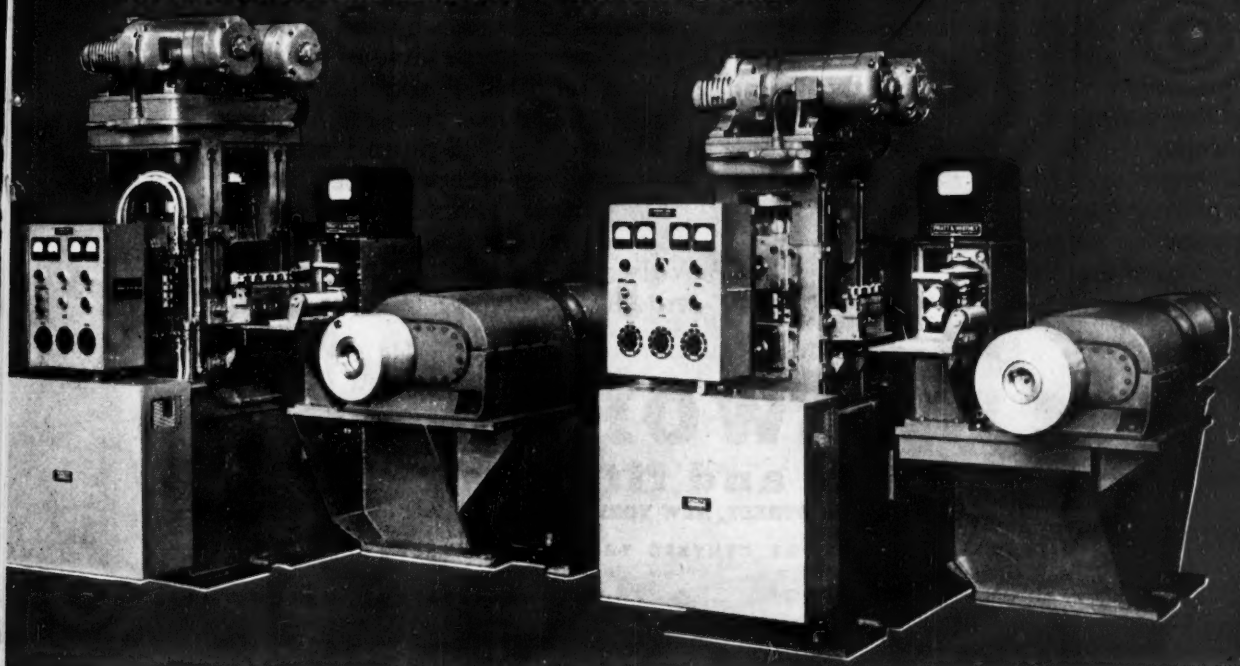

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Let's face it... the threat of war and the atomic bomb has become a real part of our life—and will be with us for years. Fires, tornadoes and other disasters, too, can strike without warning.

Whatever the emergency is, everybody's going to want help at the same time. It may be hours before outside help reaches you. The best chance of survival for you and your workers—and the fastest way to get back into production—is to know what to do and be ready to do it. Disaster may happen TOMORROW. Take these simple precautions TODAY:

☐ **Call your local** Civil Defense Director. He'll help you set up a plan for your offices and plant—a plan that's safer, because it's integrated with community Civil Defense action.

☐ **Check contents** and locations of first-aid kits. Be sure they're adequate and up to date. Here, again, your CD Director can help. He'll advise you on supplies needed for injuries due to blast, radiation, etc.

☐ **Encourage personnel** to attend Red Cross First-Aid Training Courses. They may save your life.

☐ **Encourage your staff** and your community to have their homes prepared. Run ads in your plant paper, in local newspapers, over TV and radio, on bulletin boards. Your CD Director can show you ads and official CD films or literature that you can sponsor locally. Set the standard of preparedness in your plant city. There's no better way of building prestige and good community relations—and no greater way of helping America.

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than when the speed was stabilized by the engineering department. Basic reason for the change, of course, was that now having control, the workers felt that they had something to do with the speed and could determine it themselves. Their regulation of that speed was not, as everyone had expected, at some lower level, but was, in fact, at a considerably higher average level.

"In our own operations we have found the same thing true. Where we have not stated the actual control time or control expense, we have beaten the time and expense in as many cases as we may have exceeded it. So long as we control the reasons, so long as we control the situation, so long as we control the possibility of excessive costs in our maintenance and engineering projects—so shall we accomplish the same result as was gained on the bottling line."

Corrosion Discussed

Speaking on corrosion control, R. L. Honnaker, supervisor, engineering consultants, engineering department, E. I. DuPont de Nemours & Co., Inc., Wilmington, Del., listed and described 15 different forms of corrosion of metals, almost all of them being electrochemical in nature.

In his opinion, the best possible approach, if not the answer, to corrosion problems is to assign specific personnel to handle them. This personnel should acquire a good background in knowledge of the subject including corrosive characteristics of chemicals as well as the resisting characteristics of materials. Plenty of technical literature is available.

End (*Resume reading on page 69*)

Single-Product Benefits

—*Continued from page 55*

capable of circulating 28,000 cf. of air per min., are used. Cold air moves from these units to all parts of the room through a network of ceiling-hung ducts. It is uniformly distributed with a minimum of turbulence through 48 Anemostat diffusers. In addition to 2,300 cfm. of primary air, these units induce 2,000 cfm. of secondary air, which approximately doubles air movement. This method of refrigeration provides for quick hardening of ice cream.

To facilitate defrosting, or making repairs, each King unit is installed in an individual cell in the south end of the hardening room. Cells have doors opening into the hardening room for circulation of cold air, and into a cor-

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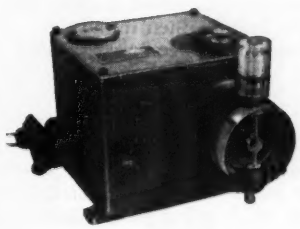

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ridor that leads from the processing area to workers rest rooms and plant offices.

Refrigeration units may be defrosted in about 30 min. by closing the doors leading to the hardening room and opening those to the corridor. Entry of air at room temperature melts accumulated snow and ice, and resulting liquid is piped to the plant drains. Once the cell has reached corridor temperature the unit can be repaired without discomfort to the mechanic.

Milk and mix-ingredient storage rooms are refrigerated with Niagara circulating units.

Refrigeration for the various plant needs—the −20 deg. hardening room, +35 deg. milk and dairy product storage rooms, and sweet-water cooler for HTST milk unit—is supplied by four vertical single acting compressors, with three new V-type, high-speed units used as boosters for the hardening room.

Ventilation of the below-ground compressor room is provided by two 30 in. (10,000 cfm.) fans that also play an important role in hardening room maintenance. Incidentally, these fans are equipped with explosion-proof motors.

In modern hardening room construction, means are generally provided for protecting the floor from damage due to freezing of the fill below.

In the Charlotte plant, 8x16 in. concrete blocks were placed on their sides under the hardening room floor to form ducts leading from outside to the rear of the compressor room. The two large fans, installed in the front wall of the compressor room and discharging to the outside, pull air through the ducts under the floor, thus maintaining the ground at above freezing temperature, then through the entire length of the compressor room to insure continuous removal of ammonia from this room.

To guard against explosion hazards associated with large ammonia leaks, three small break-glass switches similar to fire alarm boxes were installed on outside of building near compressor room entrance. When glass is broken, all motors in room are shut off and, in case exhaust fans are not operating, these are started.

Power is received at 220v. And since a majority of the motors in the plant use current at this voltage, need for transforming is minimized. Steam is produced by two Cleaver-Brooks 125-hp., oil-fired, automatically controlled boilers. Heating of products in the HTST units is by circulation of hot water from heaters suspended from the basement ceiling directly under each unit. Water temperature is automatically maintained by control of steam feed. Advantages of these heating units are: Quick response to variations in demand, minimum of water piping, and savings in floor space.

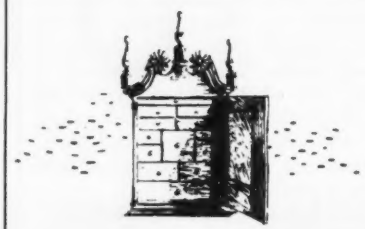
Washup stations, installed at strategic points throughout the plant (see full-page drawing) are supplied with 120 deg. water from a large tank in the basement. An additional station near the Pure-Pak fillers receives 180 deg. water (to remove congealed wax from the machines). This water is supplied from another tank.

Processing areas are heated, cooled, and ventilated by circulation of air from conditioning units through enclosed ducts and diffusers in the ceiling (see drawing).

Outside air is drawn into the system and passed through heat exchangers (cooled in summer with Freon, steam heated in winter) then fed to the processing areas. It is removed by additional ducts that return to the conditioning room.

Although provision was made for: (1) Return of all air; (2) discharge to outside, and (3) addition of outside air to the returning air, the latter method is usually employed. From 25-75% of returned air is exhausted to atmosphere and replaced with fresh air. Automatic controls insure uniformity of temperatures.

End (Resume reading on page 56)



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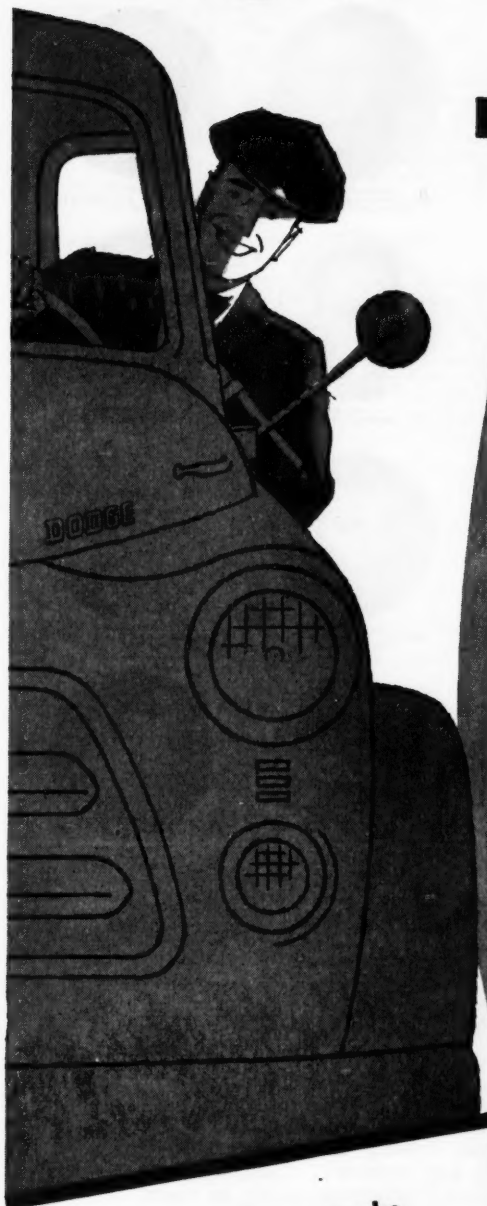

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Hear "The Roy Rogers Show" on radio (NBC, Thursdays).
See "Make Room For Daddy" with Danny Thomas on TV (ABC, Tuesdays).
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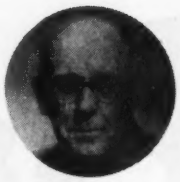

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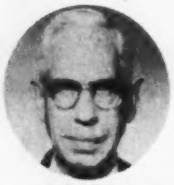

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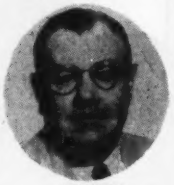

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Bread Sticks of Low Moisture Content by Dividing New Dough, Confining in Dead Air Space to Retard Fermentation and Skin Formation, Working to Elongate, Repeating Procedure, Baking—*L. M. Bertrand, Montreal to The Grissol Bread Specialties Ltd., Rosemont, Quebec, Canada. No. 2,660,134. Nov. 24, 1953.*

Pelletized Whey Product Without Binder Made by Drying, Pressing, Cooling—*L. H. Francis, N. E. Rodgers, Appleton, Wis. to Western Condensing Co., San Francisco, Calif. No. 2,661,295. Dec. 1, 1953.*

Cake Batter With Shortening Containing Acyl Radicals of Straight-Chain Monocarboxylic Acids of Selected Group—*W. C. Griffin, West Chester, Pa. to Atlas Powder Co., Wilmington, Del. No. 2,662,015. Dec. 8, 1953.*

Chewing Gum Base With Selected Vinyl Ester-Vinyl Ether Copolymer Having Desirable Elastic and Plastic Properities—*P. L. Merz, New Haven, Conn., F. Witzel and A. D. Burhams, Canojaharie, N. Y. to Beech-Nut Packing Co., Canojaharie. No. 2,662,016. Dec. 8, 1953.*

PROCESSES

Drying Lacteal Fluids by Evaporating, Causing Lactose to Crystallize, Atomizing and Suspending in Drying Gas to Form Powder Without Removing Water of Crystallization—*R. E. Meade, Appleton, Wis. to Western Condensing Co., San Francisco, Calif. No. 2,661,294. Dec. 1, 1953.*

Nut Cracker Utilizing Passage of High Electrical Voltage and Current for Shattering Shells—*F. O. McMillan, Corvallis, Ore. No. 2,661,784. Dec. 8, 1953.*

Soupmaking From Dried Legumes by Weighing Raw Split Seeds, Water and Ingredients into Container, Sealing, Still Sterilizing, to Utilize Maximum Heat Exchange From Water, Agitating to Completely Disperse Soup—*H. F. Snow to F. H. Snow Canning Co., Inc., Pine Point, Me. No. 2,662,823. Dec. 15, 1953.*

Apple Section Food Product Made by Washing, Peeling, Coring, Slicing to Sections, Bleaching in Sulphurous Acid Solution, Boiling in Sugar-Water-Gelatin Solution, Cooling, Packaging, Chilling—*M. W. Talbert, Columbia, Mo. No. 2,662,824. Dec. 15, 1953.*

Processing Poultry to Ease Picking by Immersing Body in Heated Liquid, Then Subjecting Lower Portion of Legs to Added Heat—*D. B. Van Dolah, to Swift & Co., Chicago. No. 2,663,049. Dec. 22, 1953.*

Improvement in Basket-Type Solvent Extraction by Adding More Product to Baskets After Extraction Liquid Has Been Introduced to Keep Solids from Packing—*R. P. Hutchins and F. C. Simon to The French Oil Mill Machinery Co., Piqua, Ohio. No. 2,663-624. Dec. 22, 1953.*

Treating Fruit Wastes by Pulping, Adding Ammonium Hydroxide to pH 8.5-9.5, Introducing Alkaline Divalent Metal Compound to Destroy Sliminess—*J. R. McCaughna, San Jose, Calif. No. 2,664,356. Dec. 29, 1953.*

TO STIMULATE INVENTIONS

Two bills now before congress are intended to boost morale of inventors and stimulate flow of new inventions.

They are H.R. 7645, to establish the inventor's patent income as capital gains, and H.R. 7646, which would provide 15% depletion allowance on patent income before taxes.

Bills were introduced by Rep. A. S. Camp (D., Ga.) member of the House Ways & Means Committee.

EQUIPMENT

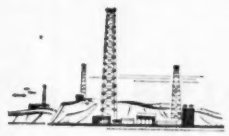
Fruit Pitter and Halver With Reciprocating Cutting Carriage—*C. H. Ansley, Rochester, N. Y. No. 2,652,085. Sept. 15, 1953.*

Fish Skinner Employing Rotating Drum Having Tail Gripper With Fingers for Positioning Fish in Engagement With Knife—*G. E. Hube to Pacific Laboratories, Inc., Bellingham, Wash. No. 2,655,688. Oct. 20, 1953.*

Flour Duster With Reciprocating Sifting Screen and Blower Discharge Housing—*A. H. Thompson, Fargo, N. D. No. 2,655,897. Oct. 20, 1953.*

Automatic Feed Control for Cereal Comminuting Apparatus Employing Servomotor Actuated by

from petroleum to peas....



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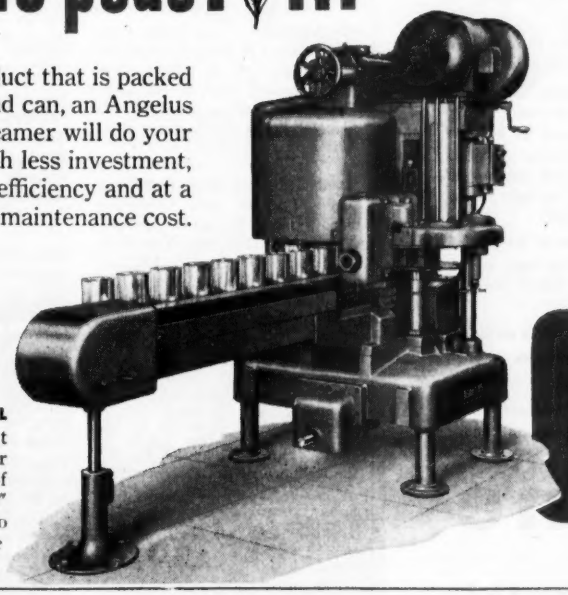

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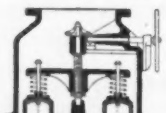
Designed for smooth, positive operation at all times, Cochrane Multiport Valves regulate line overpressure—keep back pressures within upper pressure-temperature limits... automatically!

No Freezing, Jamming, Sticking — **Multiple Discs** (3 to 16 per valve) eliminate valve failure.



No Blowdown, Vibration or Wasted Steam — **Vapor-Cushioned** valves ride with overpressure to iron-out fluctuations or pulsations . . . open s-l-o-w-l-y to bleed-off *only* excess pressure, ease closed to tight reseat *exactly at set* pressure.

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3173 N. 17th Street, Philadelphia 32, Pa.

Vanes in Product Flow to Operate Feed Gate—*F. Tanner, Sankt Gallen, Switzerland to Gebruder Burler, Uzwil, Switzerland.* No. 2,656,121. Oct. 20, 1953.

Meat Curing Device Employing Vacuum-Fed Fluid Holding Cylinder, and Plunger Integrated With Suction Stroke—*A. C. Gannon, and V. R. Rupp, Indianapolis. C. E. Kilby, Knightstown to Kingan & Co., Indianapolis, Ind.* No. 2,656,785. Oct. 27, 1953.

Pie Shell Molder Employing Hollow Male Die and Moveable Female Die—*G. R. M. Miller, Stepps, Glasgow, Scotland.* No. 2,656,798. Oct. 27, 1953.

Biscuit Feeder Employing Curved Guide Bands That Float Under Biscuit Pressure—*A. C. Page, Belgramo, Buenos Aires, Argentina to Wright's Biscuits Ltd., South Shields, England.* No. 2,656,907. Oct. 27, 1953.

Centrifugal Milling and Insect Destroying Machine With Rotary Impeller and Annular Target—*F. S. Smith, Hamden, Conn.* No. 2,656,988. Oct. 27, 1953.

Continuous Grain Dryer With Combustion Gas Heating and Forced Air Cooling Sections—*B. L. Tomlinson, St. Louis Park, and D. E. Carlson, Litchfield, Minn. to Arid Aire Mfg. Co., St. Louis Park, Minn.* No. 2,657,031. Oct. 27, 1953.

Hamburg Patty Forming Machine Employing Rotating Drum With Axial Extending Blades—*F. S. Elsaesser, Cincinnati, Ohio.* No 2.657,423. Nov. 3, 1953.

Fluid Freeze-Dehydrating Apparatus With Submerged Refrigerated Cylinders and External Scrapers—*E. P. Wenzelberger to The Commonwealth Engineering Co., Dayton, Ohio.* No. 2,657,549. Nov. 3, 1953.

Quick-Freezing Rack With Flexible Conduit to Stacked, Compressable Plates—*A. S. Alison, Norbury, London, and R. Atherton. Chelsea, London, England. to General Foods Corp., New York.* No. 2,657,550. Nov. 3, 1953

Candy Depositor With Belt-Borne Mold Cavities and Oscillating Feed— *E. D. Rapisarda, Agawam, Mass. to G. Cella, Inc., New York.* No. 2,657,647. Nov. 3, 1953.

Parallel Element Dough Working Apparatus With Adjustments to Change Surface Alignments—*H. W. Sawyer, Nutley, and L. Gelly, Newark, N. J. to Thomson Machine Co., Belleville, N. J.* No. 2.657,648. Nov. 3, 1953.

Motor Driven Convevor for Banana Bunches—*R. M. Winslow to Winston & Newell Co., Minneapolis, Minn.* No. 2,658,610. Nov. 10, 1953.

Citrus Juice Extractor Consisting of Drum With Oppositely Matching Cupping and Pressing Elements, and Hole Former in One Element—*K. K. Hudson, Tampa, Fla. to Food Machinery & Chemical Corp., San Jose, Calif.* No. 2,659,298. Nov. 17, 1953.

Cake Filling Apparatus With Means for Actuating Injecting Pump by Operator Holding Two Cakes in Unit—*L. H. Browne, Westport, Conn.* No. 2,659,320. Nov. 17, 1953.

PACKAGING

Plastic Bung for Beer Barrels Consisting of Molded Synthetic Elastomeric Material Capable of Deformation Under Excess Pressure —*V. Alvear, Passaic, New Jersey.* No. 2,657,817. .Nov. 3, 1953.

Container Packaging System With Means for Aligning, Tilting and Pushing Grouped Units Into Carton—*R. A. Smith to H. J. Heinz Co., Pittsburgh, Pa.* No. 2,657,845. Nov. 3, 1953.

Soft Plastic Food Package That Releases Molded Food by Inverting and Flexing—*L. Peters, Evanston, Ill.* No. 2,657,998. Nov. 3, 1953.

Soda Cracker Stacker and Delivery Unit With Counting Mechanism and Integrated Overwrapping Machine—*J. W. and R. J. Fay, Villa Park, Ill. to Schulze & Burch Biscuit Co., Chicago.* No. 2,661,103. Dec. 1, 1953.

Can Filler and Closer With Intermittently Driven Turret to Provide Dwell-Type Filling, Lid Application and Seaming—*L. McGihon, San Leandro, Calif. to King Sales & Engineering Co., San Francisco* No. 2,661,134. Dec. 1, 1953.

High-Capacity Continuous Filler With Plurality of Food Disk Dropping Stations Superimposed Over Container Line—*R. H. Winters to Larsen Co., Green Bay, Wis.* No. 2,662,017. Dec. 8, 1953.

Automatic Control of Container Fill Level by Means of Radiant Beam Detecting System—*W. I. Bendz, Weston, Mass. to Westinghouse Electric Corp., East Pittsburgh, Pa.* No. 2,663,477. Dec. 22, 1953.

Filler With Rotary Supply Tank Under Vacuum and Integral Valve Body Set-Up to Engage Container in Sealed Relation—*W. de Back to Food Machinery & Chemical Corp., San Jose.* No. 2,663,480. Dec. 22, 1953.

Want more information on any of these recent patents? If so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers for those you want and enclosing 25¢ for each copy.

How Servel Water Chillers

Solve your Cooling Problem

1

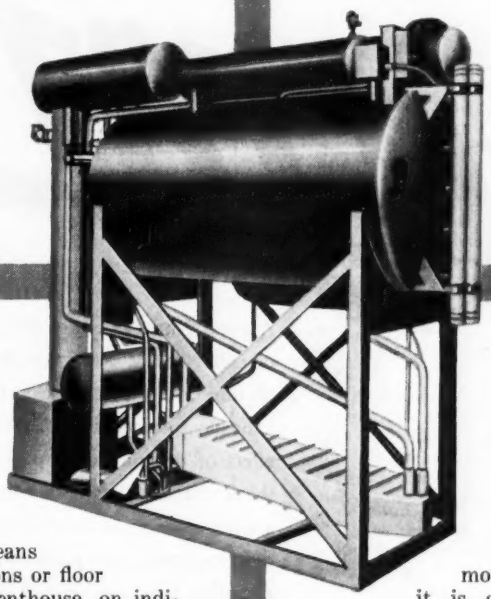
Regardless of cooling needs

The adaptable Servel 25-ton Water Chiller uses water as the refrigerant—provides economical cooling for *air conditioning, process cooling,* or *industrial pre-cooling.* Your Servel dealer can show you performance figures on applications most similar to your needs, in any of the three fields.

2

With the most economical fuel

Steam from the most economical source—gas, oil, LP gas, even *waste* heat—operates the unit, by Servel's exclusive, no-moving-parts *absorption* principle of refrigeration. This wide choice assures you of low operating costs . . . as does Servel's high operating efficiency.



3

Under every installation situation

Light floor loading and vibrationless operation means that no special foundations or floor braces are needed—in penthouse, on individual floors, or in basement. Simple piping, instead of expensive duct work, cuts installation time and costs. Zone control is unusually easy.

4

With exclusive assurance of satisfaction

The Servel Water Chiller cooling system has no moving parts to wear, thus it is quiet and vibration-free. Every Servel Water Chiller is backed by a 5-year warranty. See your Servel dealer or mail coupon for information and engineering co-operation.

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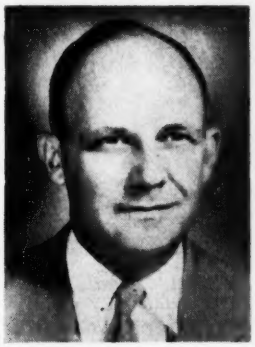


F. E. Glotfelty (left) and **R. G. Ruark** have been elected director and vice-president, and vice-president, respectively, of Corn Products Refining Co.

Industry

Acme Breweries, of San Francisco and Los Angeles, has been purchased by Liebmann Breweries, Inc., New York City.

Anheuser-Busch plans to build a $20,000,000 brewery in New Orleans.

Ashland Roller Mills, Virginia, has been sold for a sum reported to be over $150,000.

Barbys Frosted Food, Inc., Dayton, Va., has been organized to deal in frozen poultry with capitalization of $50,000.

Beech-Nut Packing Co., Canajoharie, N. Y. will construct a plant at Three Rivers, Mich. to produce and pack coffee, gum, peanut butter, baby foods and cereals.

Bonavista Cold Storage Co., Grand Bank, Nfld., has started construction on a $1,500,000 plant to process fresh fish.

Buckeye Brewing Co., Toledo, Ohio, has elected Otto W. Cummerow president, and T. R. Klinksick secretary-treasurer.

California Walnut Growers Assn., Los Angeles, suffered $300,000 fire loss at its warehouse and equipment storage unit.

Campbell Taggart Assoc. Bakeries, Dallas, has acquired seven additional plants to increase its group of bakeries to fifty-seven in twenty states.

Carolina Pecan Processing Co., Inc., has gone into full operation at Lumberton.

Driscoll Strawberry Assoc., San Martin, Calif., has begun construction of a $100,000 cold storage building and processing room to be completed April 15.

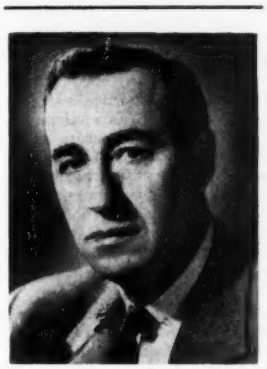
Excelsior Fresh Frosted Meat Products Co. has announced the opening of a large new plant in Long Island City.

Flavoring Extract Mfrs. Assn. has elected the following officers: president, Ben Kapp of van Ameringen-Haebler, Inc.; vice-president, Mike Siegel, of Felton Chemical Co., Inc.; secretary, John Post, Pfizer & Co.; and treasurer, John Wilson, U. S. Ind. Chemicals.

Foremost Dairies, Inc. and Golden State Co., Ltd. have announced completion of their merger.

Hi-land Dairymen's Assn., Utah, is completing a $150,000 ice cream plant at Murray, Utah.

Hygrade Food Products Corp., New York City, has purchased Carstens Packing Co., Tacoma, for a reported $3.5 million.



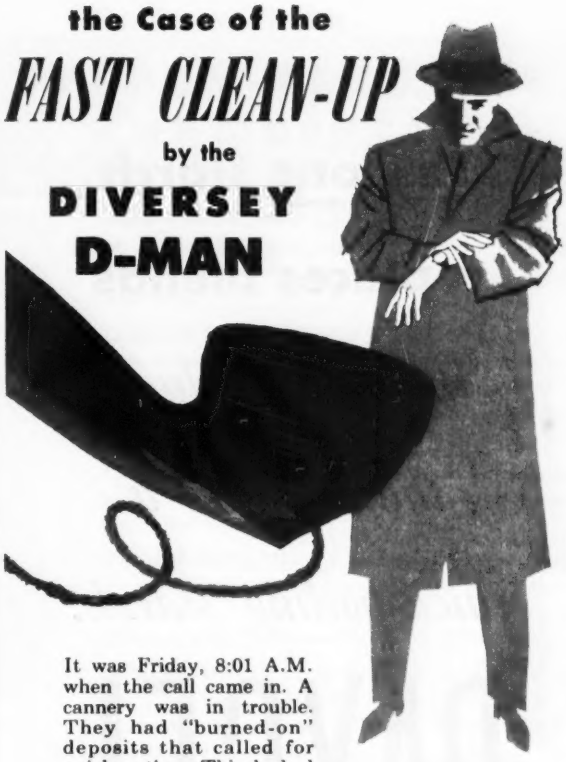
Lawrence G. Butler, president of Lakeshire-Marty Co., has been promoted to production manager of Borden Company's Cheese Div.

the Case of the

FAST CLEAN-UP

by the

DIVERSEY D-MAN



It was Friday, 8:01 A.M. when the call came in. A cannery was in trouble. They had "burned-on" deposits that called for quick action. This looked like a case for DILAC . . . the super-efficient mild-acid cleaner.

I hurried over. Sure enough, the pasteurizer, cooker and evaporator needed DILAC's gentle treatment. I could recommend DILAC because I knew it was safe . . . completely safe.

DILAC did the job . . . but I wasn't through. The cannery needed help in heavy-duty cleaning. It was a hard-water area . . . that meant DIVO-BRITE . . . the cleaner that's safe and easy to use in circulation or soak operations. For steam guns and hand-cleaning, I would have suggested DIVOLUXE . . . with the built-in water softener and extra reserve strength to maintain longer cleaning life. I know that DIVOLUXE will not discolor soft metals.

I was about to leave. Suddenly, I realized I hadn't told the foreman about RELION . . . the special Diversey product for peeling fruits and vegetables. I hadn't mentioned that RELION has outstanding free-rinsing properties which result in less carry-over and reduced operating costs.

This oversight was taken care of. I reminded the purchasing agent that Diversey has products tailored to do specific jobs in food plants . . . that no one equals Diversey's record of experience in providing the right cleaner or combination of cleaners for each job. And, the P. A. was convinced . . . "for a fast clean-up of a sanitary problem," he said, "it pays to call a D-MAN!"

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This unique General Mills wheat starch replaces inconvenient blends of starches in canned soups, salad dressings, pie fillings, confections, dessert mixes, baby puddings, custards, canned specialty foods—in fact, wherever a thick-boiling starch is needed!

Paygel is stable. It produces smooth eye-appealing product and has no cereal taste to mask flavors. And it's economical. See for yourself.

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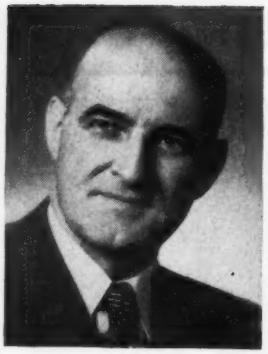


Dr. William M. Martin, inventor of Martin aseptic canning system, has resigned as vice-president of research and development division of James Dole Engineering Co. to work on newly designed patented equipment of his own.

Kraft Foods Ltd., will center its Canadian facilities in a new $7 million plant to be completed in 1955 near Montreal.

Lawndale Pastry Shop has been chartered in Greensboro, N. C. with authorized capital stock of $100,000.

Lindsey Nut Co. will build a walnut packaging and storage plant at Martinez, Calif. to cost $200,000.

Marshall Farms has been capitalized at $200,000 to operate a poultry processing plant in Belton, S. C.

Nolan Jackson-Roanoke, Inc. has been formed with capital stock of $100,000 to deal in frozen foods at Roanoke, Va.

Paramount Citrus Assn., San Fernando, Calif., is planning a new $400,000 plant at Santa Barbara for lemon juice production.

Mountain Ice, Inc., capitalized at $100,000, has obtained a charter to deal in ice and food products at Morganton, N. C.

Pepsi-Cola International, the new wholly-owned subsidiary of Pepsi-Cola Co., has named W. B. Forsythe as chairman of the board of directors and president, with W. M. Furlow as vice-president in charge of new market development, H. M. Winter, vice-president in charge of commercial operations, and W. L. Moran, Jr., manager of sales operations.

National Biscuit Co. has purchased Ranger Joe Cereal Co., originator of first pre-sweetened dry cereal.

Pictsweet Foods, Inc. will construct a new $225,000 food freezing plant at Santa Clara, Calif.

Stubby Beverages, Ottawa, Ont., suffered extensive damages from fire, amounting to over $125,000.

Truesdail Laboratories, Inc., Los Angeles, Calif., specializing in chemical and bacterological research and analysis of foods and other products announced the establishment of a research advisory board of internationally-known scientists consisting of Dr. A. J. Haagen-Smit, professor of bioorganic chemistry, Calif. Institute of Tech.; Dr. C. H. Thienes, director of Institute of Medical Research, Huntington Memorial Hospital, Pasadena; Dr. A. W. Adamson, professor of chemistry, U. of S. Calif.; Dr. Don M. Yost, professor of inorganic chemistry, Calif. Institute of Tech.; and Dr. W. G. Young, professor of chemistry and Div. Dean of Physical Sciences, U. of C.

Watson Food Products Ltd. has commenced production in its new potato chip making plant.

Welch Grape Juice Co., Inc., Westfield, N. Y., has announced impending construction of a $750,000 grape juice plant at St. Catharines, Ont. to start in April 1954.

Personnel

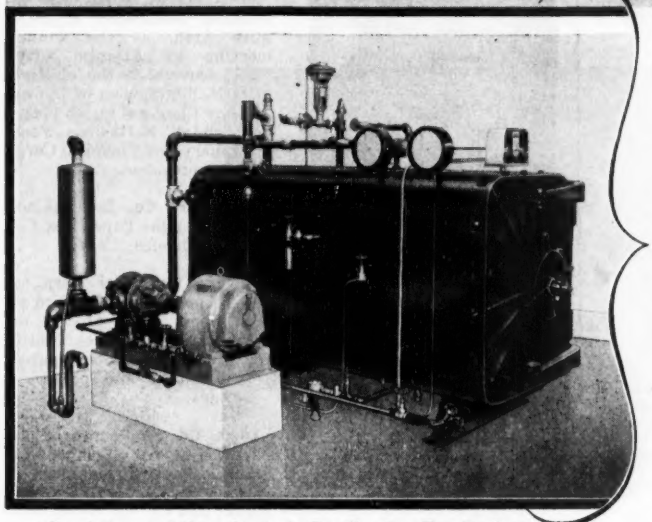
Richard E. Baiter was appointed vice-president in charge of product development, grocery division of Standard Brands, Inc.

John L. Baxter, vice-president and general manager of Snowflake Canning Co., Brunswick, Me., was elected president of the Natl. Assn. of Frozen Food Packers.

P. E. "Neighbor" Bruce has been named general manager of Citrus Fruit Corp., Clearwater, Fla.

Thomas A. Cuneo, president of Ronco Foods, is new president of National Macaroni Manufacturers Assoc.

American VACUUM-PRESSURE CHAMBERS for



STEAM STERILIZATION • Automatically controlled temperatures and exposure periods • Corrosion resistant metal chambers • Quick opening and closing "safety stop" door.

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FUMIGATION • Vacuum-pressure chambers for use with carboxide, methyl bromide or other gases for fast-high production fumigation.

MOISTURE IMPREGNATION • Products may be increased in moisture content by economical constant temperature-constant humidity process • Temperatures may be controlled to achieve destruction of insects, larvae and eggs.

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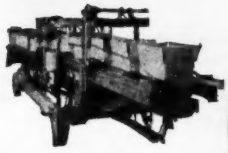

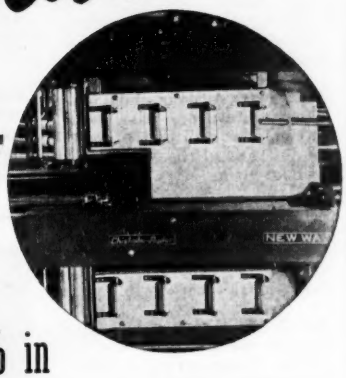

Pre-Heated Flaps Reduce Glue Costs 40% in New Way Gluer-Sealers

Actual operation figures show only NINE pounds of glue used per 1000 in a continuous run of 245,000 "303" cases. Get the facts from our nearest representative or write direct for Bulletin FE-1498.

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COMPANY OF PENNSYLVANIA
HANOVER, PENNSYLVANIA

Sales success for sauce

• Chinese style sauce is rapidly becoming a favorite household food seasoning and cooking ingredient. Much of the taste-appeal of the leading brands comes from Huron HVP—the natural protein derivatives Huron obtains from wheat. Huron HVP imparts a "meatiness" that does things for flavor—and for sales. Let Huron's Technical Service tell you which HVP to use for improving your product's flavor, and send you samples. The Huron Milling Company, 9 Park Place, New York City 7.

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HYDROLYZED VEGETABLE PROTEINS
The flavor of meat from wheat

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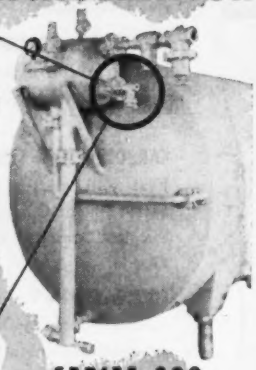
Use of Phillips Controls as original equipment on your refrigeration machinery shows that its manufacturer intends you to have the best in dependable, efficient operation. Also, Phillips Controls can help performance of older equipment. Phillips Float Controls range in capacity from 1 to 1000 tons for "Freon" and 1 to 2000 tons for ammonia. Full information and engineering advice are gladly given.



Dependable refrigerant control is assured in this Cherry-Burrell Type C Cold Wall Storage Tank with a Phillips No. 300 Float Valve.

SERIES 300
PHILLIPS FLOAT CONTROLS
SERVICEABLE—No pump down needed to inspect or renew cartridge.
ADAPTABLE to most types of flooded evaporators.
COMPACT—Mounts directly on surge drum.
IDEAL for storage tanks, air and water coolers, ice builders and other "packaged" units.
Write for Catalog.

For new equipment or replacement, look for the name PHILLIPS and be sure.

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REPRESENTATIVES: THE C & S EQUIPMENT CO.
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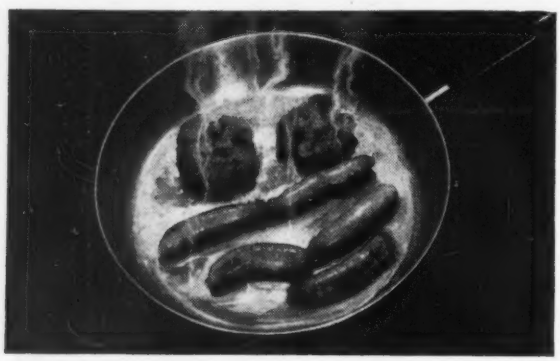


Puts sizzle in sausage sales

Pork sausage with Huron MSG tastes better and sells better! And meat packers have learned that Huron MSG helps keep fine pork flavor longer in storage. It takes only 1½ oz. of Huron MSG to boost the flavor of 100 pounds of sausage. For samples and formula recommendations, write The Huron Milling Company, 9 Park Place, New York 7, N. Y.

HURON MSG
PURE MONOSODIUM GLUTAMATE 99+%
Made by the pioneers in protein derivatives

William Geisler has been named executive vice-president of National Phoenix Industries, Inc.

Harold H. Cauvet has been appointed to the newly created post of Director of Electronic Applications of General Foods.

P. B. Grosscup, Jr. is new president of Reymer & Bros., Inc., candy and beverage manufacturers.

Leon Henderson, former OPA administrator, has been named president of Silver Bell Food Corp., new company formed to manufacture and distribute condiments and food specialties.

W. E. Hoerres has been appointed vice-president and general manager of Enzo Jel Co. of Sheboygan, Wis.

Dr. Donald V. Josephson of Penn State University will receive the $1,000 Borden Award in milk chemistry in Kansas City, Mo.

Eli Lewis, Armour and Company, Chicago, has been named chairman of the board of directors of the Natl. Assn. of Margarine Mfrs.

Charles W. Neumoyer has been elected a member of the board of directors of John H. Dulany & Son, Inc., Fruitland, Md.

Dr. C. M. Nicholson has been elected vice president and director of agriculture of Holly Sugar Corp., Colorado Springs, Colo.

Frank T. Sherk, executive vice-president and general manager of J. J. Heinz Co. of Canada Ltd., has been elected president of the Canadian Food Processors Assn.

Associated Industries

American Brake Shoe Co. has elected Kempton Dunn president to succeed Maurice M. Trainer who has been appointed vice chairman.

Atlas Powder Co., Canada Ltd., is building a $400,000 chemical emulsifier plant west of Brantford, Ont.

Canning Machinery & Supplies Assn. at the annual meeting in Atlantic City, N. J. announced the election of E. N. Funkhouser of Dewey & Almy Chemical Co. as president and C. K. Wilson, Food Machinery and Chemical Corp. as vice president.

Robert Gair Co., Inc. has acquired Angelus Paper Box Co. of Los Angeles, Calif.

Grower's Container Corp., a new corporation capitalized at $2 million, is in process of formation in Salinas, Calif. for production of corrugated paper cartons and polyethelene bags.

Ladish Co. has arranged to buy Tri-Clover Machine Co. of Kenosha and Cudahy.

Pacific Can Co. has begun construction of a new plant in Sunnyvale, Calif. to increase production of cans used in the soft drink industry.

Deaths

Louis Herziger, 68, founder and president of Herziger Sausage Co., Sheboygan, Wis. —Jan. 24.

Dana M. Hubbard, 61, editor of "The Canner."—Jan. 26.

Harry R. Nusbaum, 61, superintendent of Swift & Co. plant, New York.—Feb. 7.

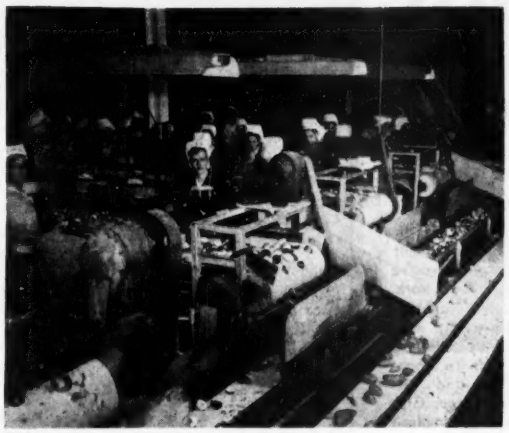
Jacques Phillip Wolf, 81, founder and president of Jacques Wolf & Co., major supplier of chemicals for the food industry.—Jan. 26.

William A. Yantis is president of new combined Bunte Brothers and Chase Candy Co., to be known as Bunte Brothers Chase Candy Co. with main offices and factory in Chicago.

SPARKS BELTING

This emblem appears on all Sparks Belting — Sno-Tex, Golden-Tex, Ny-Tex Neoprene, Kotton-Top, Tred-Tex, etc.

. . . doing an excellent job at Gerber Products Company



Where sanitation and cleanliness are of absolutely vital importance, as with the famous Gerber Products Company, canners of food for infants, Sparks Sno-Tex Belting is a first choice.

Sparks Sno-Tex looks clean, is clean and can be kept clean. Thoroughly impregnated against oil, greases, juices and heat with high resistance to bacterial development.

Will operate satisfactorily over very small pulleys, slider boards or rolls. Chosen by bakeries, canneries, confectioners and all food handling concerns.

Write for details. Quick delivery on belts built to your specifications.

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• **D. E. SHIPP BELTING COMPANY**
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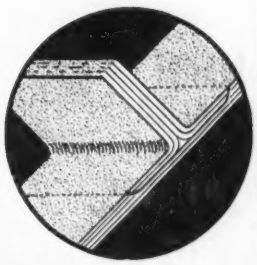
SANI-CLEATS

Patent pending. The most advanced step in food conveying. Solves cleated belt problems.



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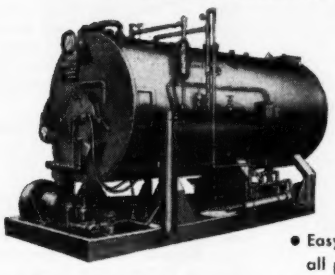

- A complete unit, piped and wired, ready for service connections.
- Needs no special foundation or expensive stack.
- Fully automatic . . . attention-free.
- 80% efficiency means real fuel savings.
- Easy to clean and service . . . all parts accessible.

20 SIZES — 10 to 600 h.p. —
15 to 200# OIL OR GAS

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You can heighten the flavor of your chili con carne —canned, frozen, or brick and get a smoother blend of the spices by adding only 4 to 6 oz. of Huron MSG per 100 pounds. If your chili is frozen, Huron MSG will safeguard its improved flavor for longer storage periods. Let Huron's Technical Service tell you how. The Huron Milling Co., 9 Park Place, New York 7, N.Y.

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PURE MONOSODIUM GLUTAMATE 99+%

Made by the pioneers in protein derivatives

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Model TA-RA *with* EXTRA-FAST ROTA-THERM JACKET

You can't be dead-certain about any Agitator Kettle until you've seen it perform on your own work. So, it's best to try before you buy. Let us send you the widely used MODEL TA-RA that has surprised so many processors with its amazing versatility and all-around performance. Give it a real test in your plant under our BORROW ON APPROVAL PLAN. Put it through every pace. Then you be the judge. We'll send it complete with variable speed drive and parts for every kind of simple or violent mixing. Use them all . . . use them separately . . . see what it can do for you.

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New Catalogs and Bulletins from manufacturers of equipment and supplies —Free For The Asking—

Food Plant Equipment

Diameter Tubes

Application of 2½ in. diameter tubes to 3-drum boilers, featuring large water holding capacity with special method of steam take-off. Catalog SB-49. 8 p.—*Erie City Iron Works, Erie, Pa.*

Circle 260A on Reader Service Card

Impact Pulverizer

Models of stainless steel impact pulverizers. Bulletins A and B. Each 4 pages.—*Pulva Corp., 550 High St., Perth Amboy, N. J.*

Circle 260B on Reader Service Card

Brewing Equipment

Features of gas compressor for collecting and reclaiming CO_2 fermentation gas. Bulletin 10. 4 p.—*Hasselburg Co., Forest Park, Ill.*

Circle 260C on Reader Service Card

Induction Motors

Dimensions and diagrams of various types of 1 to 40 hp. induction motors. Bulletin 1600. 8 p.—*Louis Allen Co., 1324 W Wisconsin Ave., Milwaukee 3.*

Circle 260D on Reader Service Card

Air Handling Units

Features of line of air handling units for industrial and commercial heating, ventilating and air conditioning applications, with accessories. Bulletin 1600. 6 p.—*Westinghouse Sturtevant Div., Dept. T-071, 200 Readville St., Hyde Park, Boston 36.*

Circle 260E on Reader Service Card

Wire Cloth

Applications of wire screen and filter cloth in custom-designed washers, strainers and filters. Bulletin 531. 8 p.—*Multi-Metal Wire Cloth Co., Inc., 1350 Garrison Ave. at Whittier St., New York 59.*

Circle 260F on Reader Service Card

Steam Boiler

Automatic package boiler utilizing principle of off-center firing. Bulletin EC-1152. 4 p.—*Dutton Boilers, Div. of Hapman-Dutton Co., Kalamazoo, Mich.*

Circle 260G on Reader Service Card

Cooling Tanks

Three models of dual-purpose milk storage and cooling tanks. Bulletin MST-50240. 4 p.—*Heil Co., Hillside, N. J.*

Circle 260H on Reader Service Card

Packaging Machine

Two models of paper box gluing, feeding and wrapping machine. 6 p. folder.—*Stokes & Smith Co., 4950 Summerdale Ave., Philadelphia 24.*

Circle 260I on Reader Service Card

Air Valve

Engineering details of wobble-rod air valve for on-off control with pneumatic systems. Bulletin 61861. 8 p.—*Pantex Mfg. Corp., P.O. Box 660, Pawtucket, R. I.*

Circle 260J on Reader Service Card

Drive Belts

Installation and operation features of adjustable v-belts for belted drives. 8 p. catalog.—*Manheim Mfg. & Belting Co., Manheim, Pa.*

Circle 260K on Reader Service Card

Centrifugal Equipment

Descriptions and photos of characteristics and uses of centrifugal separators. 8 p. booklet.—*Heyl & Patterson, Inc., 55 Water St., Pittsburgh 22.*

Circle 260L on Reader Service Card

Speed Reducer

Construction details, diagrams, and selection tables of in-line reduction units. Catalog P-53. 16 p.—*Philadelphia Gear Works, Erie Ave. & G St., Philadelphia 34.*

Circle 260M on Reader Service Card

Emergency Generator

Group of emergency generators ranging in size from 2000 watts to 15,000 watts in revolving armature and revolving field design and also with 3 phase characteristics. Form EG1153.—*Katolight Corp., Makato, Minn.*

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Feed Pumps

Small-size and simple diaphragm type positive displacement pumps constructed of synthetic materials to handle wide variety of chemical solutions. Bulletin PM 20. 4 p.—*Precision Machine Co., 8 Walnut St., Somerville 43, Mass.*

Circle 260O on Reader Service Card

Filling Equipment

Information on line of filling equipment for handling still liquids and semi-liquids, also filler for acids and oils and other similar products. Bulletin 155. 4 p.—*Horix Mfg. Co., Corliss Sta., Pittsburgh 4.*

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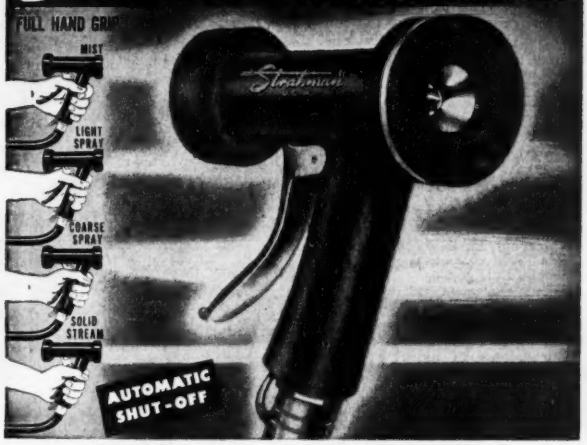
Strahman AUTOMATIC WATER-SAVER SPRAY NOZZLE



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Smaller unit with capacities to 30 gallons per hour..... **$55.00**

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Are your food product and improvement problem listed above? Then follow the lead of top food manufacturers and try SeaKem "Colloids Out of the Sea".* Discover how SeaKem Products can help improve *your* food product . . . make it better . . . easier to sell.

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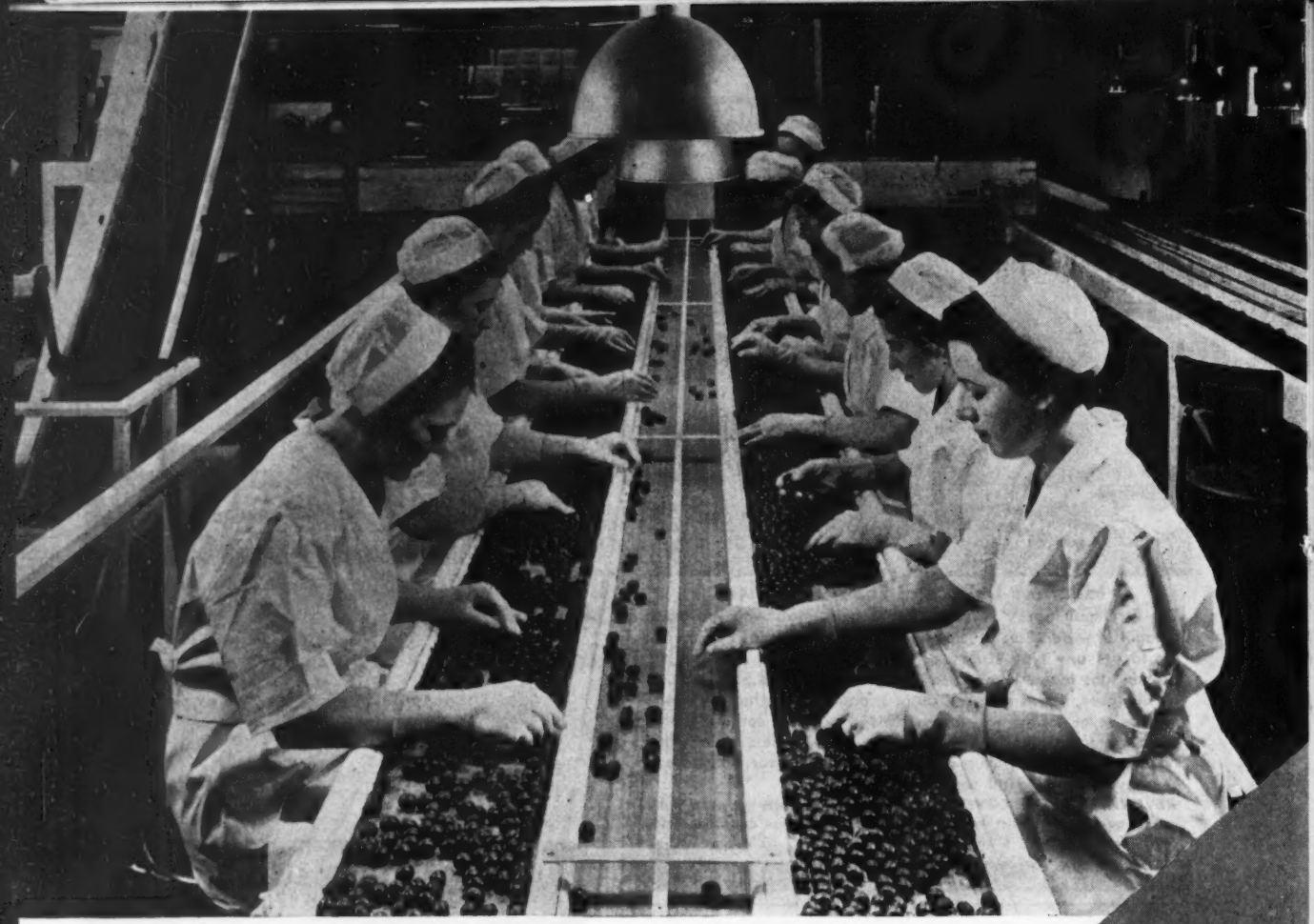

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Thermoid Conveyor Belting cuts handling costs on food processing jobs

Thermoid
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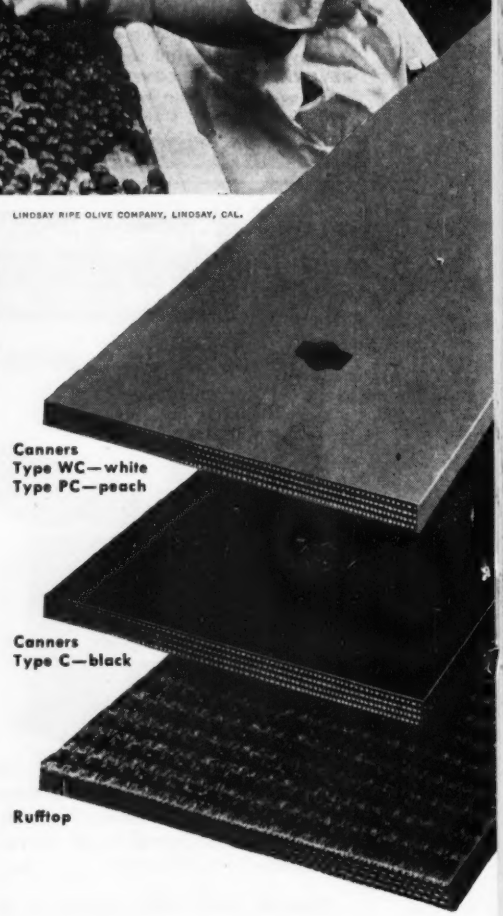
Quality Value Service

There's a Thermoid Conveyor Belt designed to lower your costs of handling any food product. Here are 3 examples: *CANNERS (WC & PC)*—For handling vegetables, fruit and other foods. Resists acids. Imparts no taste or odor. Available in white or peach color covers. *CANNERS C*—Ideal for use where food is not in direct contact with belt. For packages, waste and refuse. *RUFFTOP*—Thousands of irregular gripper points guide smooth surfaced articles up inclines to 35°.

Thermoid's exclusive impregnation process welds carcass and cover into an exceptionally strong, durable belt. Finest quality reinforcement and specially compounded rubber stocks assure long life, less down time, lower handling costs. Your Thermoid Distributor can help you select the Conveyor Belt best suited for your requirements. If you prefer, write direct for Catalog 3679.



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Control Equipment

Hair Hygrometers
Description of industrial hair hygrometers and thermometers, recorders and recording controllers. Bulletin 6504. 4 p.—*Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne & Windrim Aves., Philadelphia 44.*

Circle 263A on Reader Service Card

Control Instruments
Reference manual covering new EM-75 electron microscopes, X-ray diffraction, spectrometry and accessories such as tubes, rectifiers and cameras, along with information on applications. 64 p. booklet. —*Research & Control Instruments Div., North American Philips Co., Inc., 750 S. Fulton Ave., Mt. Vernon, N. Y.*

Circle 263B on Reader Service Card

Moisture Balance
Features, specifications and accessories of moisture balance. Bulletin 75. 4 p.—*Central Scientific Co., 1700 Irving Park Rd., Chicago 13.*

Circle 263C on Reader Service Card

Filtering System
Photos, description and specification data on 2-unit system comprised of filter and filter-aid feeder. 6 p. folder.—*Klein Filter & Mfg. Co., 1225-29 School St., Chicago 13.*

Circle 263D on Reader Service Card

Viscosity Measurer
Application data, specifications, diagrams of system for accurately measuring viscosity under industrial conditions, for use on Newtonian and non-Newtonian materials. Report TI 27-A-16b. 4 p. —*Foxboro Co., Foxboro, Mass.*

Circle 263E on Reader Service Card

Proximity Meter
Description of electronic device for comparing, measuring or monitoring dimensions and distortions previously impossible to achieve by mechanical means. Leaflet F-951.—*Fielden Instrument Div., Robertshaw-Fulton Controls Co., Dept. PM, 2920 N. 4th St., Philadelphia 33.*

Circle 263F on Reader Service Card

Materials Handling

Fork-Lift Trucks
Models of 1500-15,000 lb. capacity fork-lift trucks with standard and many specially engineered accessories. Bulletin DM 53-3. 8 p.—*Towmotor Corp., 1226 E. 152nd St., Cleveland 10.*

Circle 263G on Reader Service Card

Hand Truck
Special uses and specification charts of line of hand trucks. Catalog 10-M. 8 p.—*US Products, Inc., Columbus, Ind.*

Circle 263H on Reader Service Card

Conveyor Belting
Types of rubber conveyor belting and uses. 4 p. folder.—*Hamilton Rubber Mfg. Corp., Trenton 3, N. J.*

Circle 263I on Reader Service Card

Truck Tanks
Construction, operation and maintenance features of truck tanks and accessories for delivering petroleum products. Bulletin TT-52227. 6 p.—*Heil Co., Hillside, N. J.*

Circle 263J on Reader Service Card

Plant Supplies

Floor Enamel
Quick drying floor enamel for use on metal, wood, or concrete, is featured in folder.—*Wilbur & Williams Co., 130 Lincoln St., Boston 35.*

Circle 263K on Reader Service Card

Packaging Foil
Elaborate, comprehensive presentation of characteristics and uses of aluminum foil as packaging material along with tables and charts showing moisture vapor transmission rating of various types. Reference booklet, ringbound. 30 p.—*Reynolds Metals Co., Desk PR, 2500 S. Third St., Louisville 1.*

Circle 263L on Reader Service Card

Bread Emulsifier
Review of application of emulsifiers to bread baking and answers to technical questions. Folder.—*Hachmeister-Inc., Pittsburgh 30.*

Circle 263M on Reader Service Card

Rubber Parts
Engineering and design information on wide range of custom molded parts, including thermoplastic and synthetic rubber rings and hydraulic packings. 24 p. catalog.—*Stillman Rubber Co., Dept. C, 5811 Marilyn Ave., Culver City, Calif.*

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Acid-Proof Coatings
Description of acid- and alkali-proof maintenance paints. Bulletin DK-1-53. 4 p.—*Electro-Chemical Engineering & Mfg. Co., 750 Broad St., Emmaus, Pa.*

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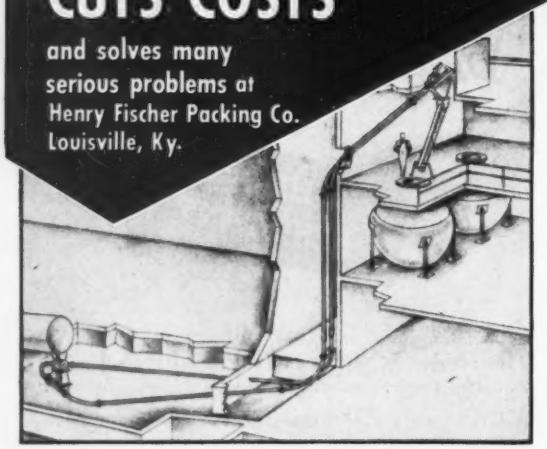

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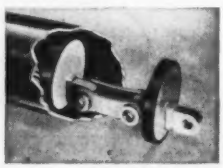

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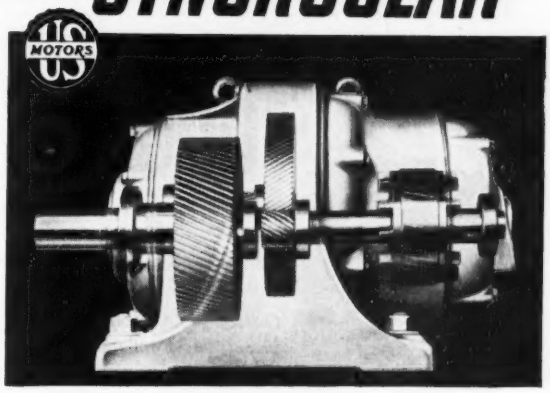

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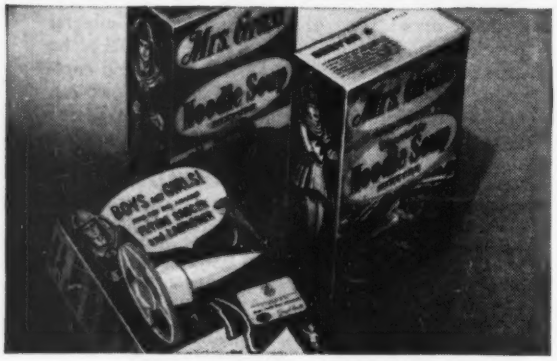

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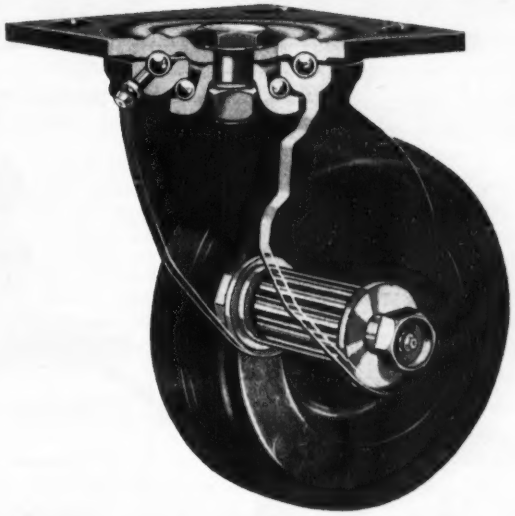

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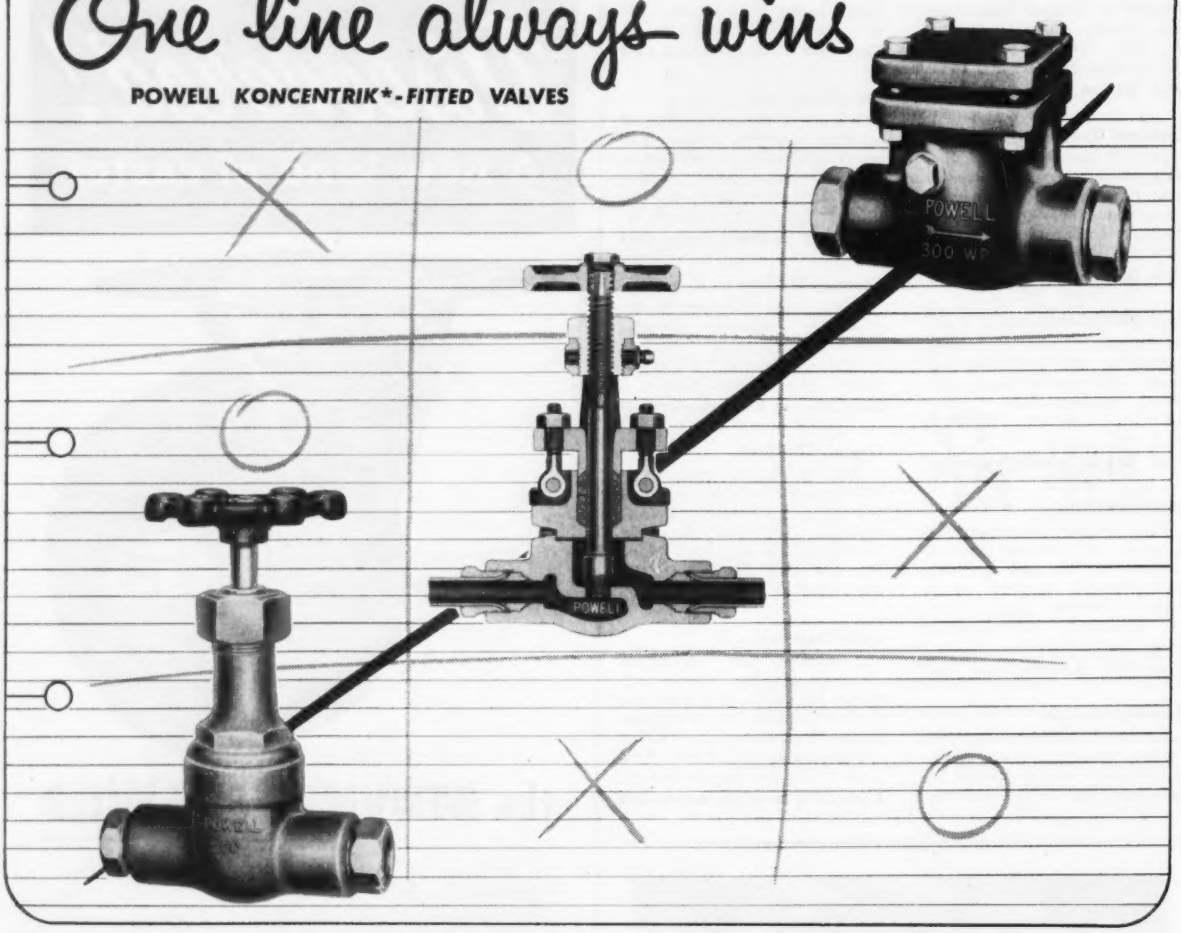

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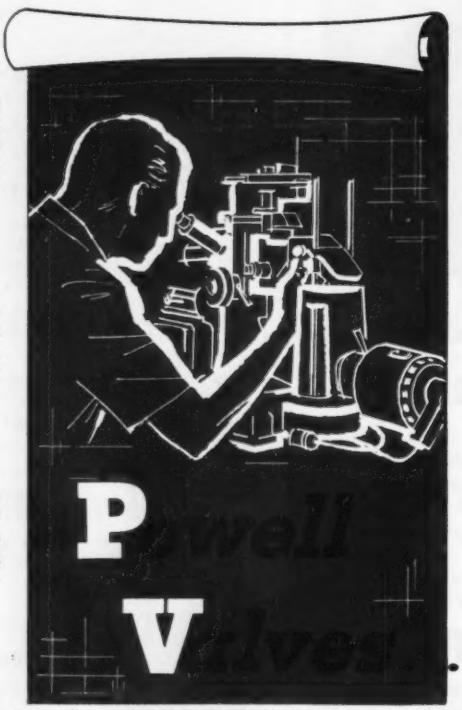

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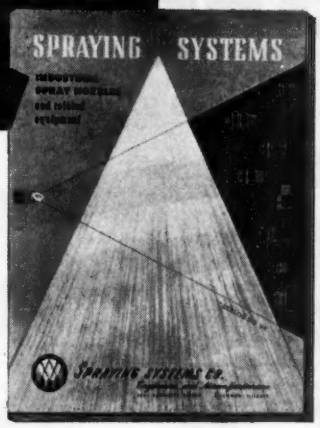

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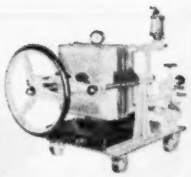

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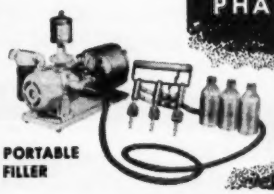

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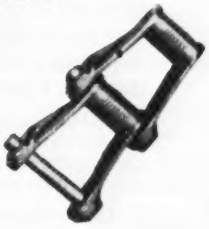

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Testing Tomato Products, Mayonnaise, Pickles, Oils, Fats, Beverages, Sugars, Filth in Foods, Food and Drug Labels, Expert Testimony
1403 Eutaw Place Baltimore 17, Maryland

An Investment!

Productive advertising is an INVESTMENT rather than an EXPENDITURE.

"Searchlight" advertisers almost invariably report prompt and satisfactory results.

BE CONVINCED — send us your advertisement TODAY.

Address
Classified Advertising Division
FOOD ENGINEERING
330 W. 42nd St., N. Y. 36, N. Y.

WHERE TO STORE FROZEN FOODS

QUAKER CITY COLD STORAGE CO., INC.
PHILADELPHIA, PA.
3 WAREHOUSE LOCATIONS
Proper Temperature for Frozen Foods

New Advertisements

recevied by March 25th will appear in the April issue subject to limitation of space available. Address copy to the

FOOD ENGINEERING
330 W. 42nd St., New York 36, N. Y.

INGREDIENTS FOR THE FOOD PROCESSOR

CARROT OIL makes food golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

SEND FOR BOOKLET
New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!
NUTRITIONAL RESEARCH ASSOCIATES
205 Broad St., South Whitley, Ind.

CLASSIFIED SEARCHLIGHT SECTION ADVERTISING

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:

$1.50 a Line—Minimum 3 Lines.

To figure advance payment count 5 average words as a line.

POSITION WANTED undisplayed advertising rate is one-half of above rate, payable in advance.

PROPOSALS, $1.50 a line an insertion.

INFORMATION:

BOX NUMBERS count as one additional line.

DISCOUNT of 10% if full payment is made in advance of four consecutive insertions of undisplayed ads (not including proposals).

EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

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The advertising rate is $13.25 per inch for all advertising appearing on other than a contract basis. Contract rates on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

Send NEW ADVERTISEMENTS to New York City Office, 330 W. 42nd St., New York, 36, N. Y., for the April issue closing March 24th

---

PROCESS EQUIPMENT LINES WANTED FOR SOUTHERN CALIFORNIA

Headquarters, Los Angeles—well established.

13th year — this territory.

Good volume now for present principals.

Can add few good lines by well established Manufacturers anxious for aggressive, capable experienced Engineering Sales Representation.

Lines now:—Steam Jet Ejectors, Steam Vacuum Refrig., Surface and Barometric Condensers, Bag type Dust Filters—Fire Tube Boilers.

Good Will with Oil Refiners, Chem. Plants, Food Proc., Cons. Eng'r's. & Contractors result good engineering.

Good Service & Good Sales Effort.

Owner will stop in Chicago, Detroit, Cleveland, and New York, late April or early May for discussions.

Reply

RW-1785, Food Engineering
1111 Wilshire Blvd., Los Angeles 17, Calif.

FOOD PACKAGING ENGINEER

Enjoy a satisfying future in southern New England with one of the nation's most rapidly growing industries.

Career position for experienced Packaging Engineer in modern research and development laboratory.

Engineer selected will be Project Leader in our Research and Development Division responsible for adaptation of packaging films to food packaging.

Retirement and insurance plans. Assistance in relocating. Salary open.

Write

P-1903, Food Engineering
330 W. 42nd St., New York 36, N. Y.

PACKAGING ENGINEER

Top Level Packaging Engineer needed for modern research and development laboratory in southern New England by one of the nation's most rapidly growing industries. Must have a thorough background in Mechanical and Chemical Engineering, and experience in printing adhesives, and heat sealing equipment on flexible packaging materials. Salary open.

Retirement and insurance plans. Assistance in relocating.

Write

P-1906, Food Engineering
330 W. 42 St., New York 36, N. Y.

REPLIES (Box No.): Address to office nearest you
NEW York: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITION VACANT

MECHANICAL ENGINEER for plant design, process development, trouble shooting. Interesting work in Engineering department of Midwest dairy by-products processor. Salary commensurate with qualifications. Replies held confidential. P-1807, Food Engineering.

EMPLOYMENT SERVICE

SALARIED PERSONNEL, $3,000-$25,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F, 241 Orange St., New Haven, Conn.

POSITIONS WANTED

PRODUCTION MAN, experienced and exceptionally capable man in the operation of processing and packaging lines for the manufacture of various food commodities including frozen food specialties desires responsible position established producer and packer. Reasonable salary. PW-1601, Food Engineering.

FOOD CHEMIST: Excellent background in food processing. Experienced in the manufacture and processing of retail and institutional frozen and canned fruits and bakers supplies. Complete knowledge of chemical analyses, quality control, plant lay-out and plant management. PW-1687, Food Engineering.

FOOD TECHNOLOGIST—B.A. chemistry 1948, Age 29. Married. Veteran. 4 years experience: production and quality control with confectioner. 1½ years control and consumer research on industrials. Anxious to locate with organization that needs personnel with technical knowledge and managerial ability. Location immaterial. PW-1947, Food Engineering.

MECH. ENGINEER (Professional) 14 yrs. experience in development, research and production of special and packaging machinery desires position of responsibility in the packaging industry. PW-1756, Food Engineering.

AVAILABLE FOOD Technologist with experience in diversified line of products and types of operations (Canning, Freezing) and academic background in business desires to invest and participate in small to medium size food manufacturing organization. PW-1833, Food Engineering.

PLANT LAYOUT & Project Engineer, 50, experienced designer food processing & material handling equip't., piping & mechanical installations. Can relocate. PW-1842, Food Engineering.

PLANT ENGINEER-P.E. New York; M.E. 10 years broad food industry experience for large food chain including canning, packaging, processing, frozen. Qualified supervise layout, construction, operation, maintenance with progressive organization. For resume write PW-1850, Food Engineering.

PLANT SUPERINTENDENT-Production Manager in a rut. Seeks challenging opportunity with progressive organization. Fifteen years diversified experience canning fruits and vegetables. PW-1946, Food Engineering.

AGRICULTURAL CHEMIST (engineer from Belgium) methods of A.O.A.C. 25 years experience in analytical chemistry. 4 languages. Immigration visa. Contract investigation. PW-1857, Food Engineering.

FOOD TECHNOLOGY enables mature executive to offer services on a consultative basis. Quality up-grading. Methods analysis efficiency installation etc. PW-1948, Food Engineering.

WE NEED!

FOOD TECHNOLOGISTS and FOOD CANNING CANDIDATES
—junior to top-level.

Call, write or wire:
Gladys Hunting (Consultant)
Employment Counsel, Inc.
7 W. Madison St. Chicago 2, Ill.

For Sale or Long-term Lease FOOD PLANT

Cleveland, Ohio

Complete with refrigeration equipment for low temperature fast freezing, plus 920 sq. ft. low temperature room. Entire building 8,000 sq. ft., brick, 1 story, high ceiling, offices, plus 5,000 sq. ft. of land.

FS-9618, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

FOOD PLANT WANTED

We are now manufacturing over $20,000,000 in various lines and wish to expand by acquisition of assets of stock of one or more industrial companies. In our negotiations the sellers' problems and wishes will receive full consideration. Present personnel will normally be retained.

Address all replies
"Confidential" C. J. GALE, Sec.
233 Broadway, N. Y. 7, N. Y. BA 7-1819

WANTED

TO EXPEDITE PRODUCTION

Food Processing Equipment including Aluminum and S/S Kettles, Mixers, Vacuum Pans, Dehydration equipment, Grinders, Elevators, Stills, Colloid Mills, Conveyors, Filters, Packaging Units, Wrapping Machines. Will consider a set up plant now operating or shut down. When offering give full particulars.

P. O. Box 1351
Church Street Sta., New York 8, N. Y.

IF THERE IS

Anything you want

that other readers of this paper can supply

OR—
Something you don't want

that other readers can use, advertise it in the

Searchlight Section

MODERN REBUILT EQUIPMENT
At Tremendous Savings

UNION Rebuilt Machinery Established 1912

Elgin 24-Head Rotary Vacuum Filler.
Resina Model LC automatic Capper.
Capem 1SF automatic Capper.
Kyler A, Burt adj. Wraparound Labelers.
Baker Perkins BB, Unidor (Vacuum) 4 to 150 gal. Double Arm Jacketed Mixers, Sigma or Fish Tail Blades.
Koven 2500 gal. Steam Jacketed Spiral Paste Mixer.
Day, Robinson Dry Powder Mixers and Sifters, 200, 600, 1300, 10,000 lbs.
850 gal. Steel Vertical S. J. Mixer.
B. P. type 3500 gal. Steam Jacketed Double Arm Mixer.
Day 650 gal. Jacketed Jumbo Mixer.
Stokes, Day, New Era, Hottman Mixers, 2 to 3500 gals. with/without Jackets, Single and Double Arm Agitators.
Fitzpatrick "D" Comminuter.
Mikro 4TH, 3TH, 3W, 1SH, Bantam Pulverizers; Schutz O'Neill Mills.
Tyler Hum-mer #27 2-Deck Electric Sifter.
F. J. Stokes RD3 and RBB (1200 plus per min.) Rotary Tablet Machines.
Colton 2, 3 Rotary & 4 Tablet Machines.
Stokes & Smith A and B Transwrap.
Stokes & Smith HG88 and G1, Duplex Auger Fillers.
Whiz Packer and Triangle Vol. Fillers.
Triangle Package Models G1, G2C, G2S, N2CA, Elec-Tri-Pak Fillers.
Horix 14-Head Rotary Vacuum Filler.
Filler 4, Hope 6 S.S. Piston Fillers.
Doughboy, Amsco Rotary Bag Sealers.
Standard-Knapp No. 429 Carton Sealer.
Hudson Sharp Campbell Cello. Wrapper.
Hayssen; Package Machy. Co. FA, FA4, DF, CA2; Miller and Scandia automatic cellophane Wrappers.
Oliver 799E auto. cellophane Wrapper.
Shriver, Sweetland, Alsop Filter Presses.
Pneumatic automatic Cartoning Unit, 60 and 30 per min.

Additional Information and Quotations Available on Request
Write Today or Wire Collect

UNION STANDARD EQUIPMENT CO.
318-322 Lafayette Street New York 12, N. Y.

TOP PRICES PAID FOR YOUR SURPLUS EQUIPMENT

FOR SALE

275 gal. S.S. Tank, 42" x 48".
300 gal. Horiz. S.S. Tank, 3' x 6'.
75 gal. Monel Jktd. Kettle, 35" x 27", agit.
100 to 200 gal. S.S. Mix Tanks, water jkt.
200 gal. Pfaudler Glass Lined Tanks, water jkt.
1000 and 3000 gal. Glass Lined Tanks.
26" Centrifugal Extractors, 3 H.P.
75 to 1500 gal. Homogenizers or Viscolizers.
Model 148C Stokes Vacuum Pump, 1½ H.P.
3000 gal. S.S. Truck Tanks, Trailerized.
A.B.C. Carton Compression Unit.
5-Unit Room Coolers, Freon or Ammonia.
3 Ton Clark Fork Lift Truck, solid tires.
2 H.P. Freon & 15 H.P. Amm. Compressor Units.
35 H.P. International Boiler, Oil Fired.
Milk Pasteurizers, Coolers, Fillers, Washers.

Send us your inquiries

LESTER KEHOE MACHINERY CORP.
1 East 42nd Street New York 17, N. Y.
Murray Hill 2-4616

— FOR SALE —

8—Groen Stainless Steel Jacketed Kettles, 80 gallons each.
2—Stainless Steel Jacketed Vacuum Kettles, 500 gallons each.
2—Stainless Steel Jacketed Vacuum Kettles, 200 gallons each.
1—Pfaudler glass lined Jacketed Reactor, 30 gallons.
1—Pfaudler glass lined Jacketed Reactor, 100 gallons.
1—Link Belt Steel Roto Louvre Dryer 7½' x 20'
1—Sharples Type 316 Stainless Steel Super D Hydrator Model C-20.

R. GELB & SONS, INC.
UNION, N. J.
Est. 1886 UNionville 2-4900

RELIABLE PROCESSING EQUIPMENT from LOEB

VACUUM PAN: Henszey 36" stainless steel.
PULVERIZERS: Mikro 2DH (new).
MIXER: Day 150 gal. s.s., sgl. arm. 10 hp.
MIXERS: Sgl. and Dbl. arm, jjkt., plain.
EVAPORATOR: Conkey 60 sq. ft., s. st.
POWDER MIXERS: 100 to 2000 lb. capacities.
KETTLES: Savage 50 gal. st. steel, tilt back, dbl. act. agitators, 125 psi.
KETTLES: Stainless steel, 20 to 100 gallons.
KETTLE: 20 gal. s.s. jkt., gas fired.
DRYER: Nordyke-Marmon 80 bu., st. steel.
DRYER: Devine Vacuum Drum 2'x4', st. steel.
DRYER: Louisville s.s., pilot plant size.
CARTON SEALERS: Ceco model 3901.
LABELERS: New Jersey, Burt, Knapp, World.
FILTER PRESSES: 7" to 24" sizes.
PISTON FILLERS: Geyer, Elgin, Kiefer, M&S.
LIQUID FILLERS: Vacuum and Siphon types.
PREHEATER: Double row 14 s.s. tubes 10' lg.
DOPP KETTLES: 200 gal. jktd. iron.
POWDER FILLERS: Triangle, Stokes & Smith, Edthauer, Weighrite.
SCREENS: Rotex and Roball 20x48".

"REBUILDERS FOR 30 YEARS"

LOEB EQUIPMENT SUPPLY CO.
1931 W. NORTH AVE. • CHICAGO 22, ILL.
Brunswick 8-5326

MODERN PACKAGING EQUIPMENT
FOR IMMEDIATE DELIVERY

PNEUMATIC SCALE CO. Automatic Cartoning Line, consisting of: Automatic Feeder, Bottom Sealer, Liner, Filler, Top Sealer & Compression Unit.
PNEUMATIC SCALE CO. Large and Small Liners.
PNEUMATIC SCALE CO. Tightwrap, High Speed.
PNEUMATIC SCALE CO.—WORLD and PONY fully automatic and semi-automatic labelers, 60-120 per minute.
PNEUMATIC SCALE CO., CONSOLIDATED AND RESINA fully automatic Cappers, 1, 3 and 4 Head.
STANDARD-KNAPP Model 429 Case Sealer and Compression Unit.
STANDARD-KNAPP Case Loader and Unloader.
STOKES & SMITH model HG84, Twin Auger Filler with Vacuum Attachment, Also Models G and GD.

Partial List—send for complete list of equipment in stock.

WANTED

PNEUMATIC SCALE CO. automatic feeders and bottom sealers. Medium or high speed. Will also purchase complete lines.
PACKAGE MACHINERY CO. Model FA or FAQ cellophane wrappers.

ALLIED EQUIPMENT CO.
940-946 Nepperhan Ave., Yonkers 3, N. Y.
Phone: Yonkers 5-0442

YOUR BEST SOURCE for Used Equipment in U. S.

FILLERS

M & S 6 pocket for #10 cans. Brass contact.
M & S 10 Pocket for #202. Stainless Steel
Elgin 8 Pocket Rotary for #10. Brass Cont
Geyer 6 Piston for 1# & 2#. Stainless
Pfaudler Rotary 12 piston, set for #2 cans
King 8 pocket rotary auto for #202 cans
FMC 18 head Rotary juice filler for #307
Ayars 16 valve juice filler for #404
U S 30 Spout Rotary Automatic for liquids
Biner-Ellison Fil-Labeler, 8 oz to gallons
Kiefer 16 spout Rotary Vacuum, up to quart
Horix 28 Spout, for Ketsup & Chili Sauce
Pomona 17 head, from 8 oz to gallons
Ertel 12 spout straight line, S.S. contact
Sprout-Waldron Monarch auger, 25# to 100#
Ferguson Packomatic for #301 fibre cans
Stokes & Smith auger type model G-2
A-B 20 valve Syruper now set for 8 oz
Judge 20 valve Syruper, now set for #2½

COOKERS & COOLERS

A-B 55" dia, cooker 2013 cooler 957 #2-2½
A-B 5' square type for #10, 560—300 cans
Berger-Carter 46 oz round shell. 275 cans
A-B Pressure type #2-2½. 1254—452 cans
A-B 7' dia for #303. Cooker 2140 Cooler 720
A-B 4' sq tank type, clr 2400, clr 400

PEELERS

FMC Continuous steam, complete with elev
Urshel continuous abrasive with 5 HP motor
Benner Nawman Lye, 42" mesh draper 8' long
Draper lye peeler 36" wide 12' long
Sterling batch type, 18"—20"—26"—28" sizes

CASERS

Knapp Model F now set for #1 coffee size
Knapp Model F adj for #303, #2 & #407
Nu-Way double lane for #2, with elevator
Burt model PCE, now set for #2½ cans
Kyler model E for #10 cans
Knapp Model FE, set for 2½ cans
Knapp model 830, for pint & quart bottles
Knapp master casers, for inserting 4 cartons into larger shipping case

LABELERS

Knapp heavy duty, adj to 46 oz can size
Biner Ellison Labelmaster, up to gallons

World Straightaway for gallon and halfs
Pneu Scale Duplex front & back up to qts
O & J Rotary Automatic for half gallons
Ermold 8 wide, body neck & foil automatic
World Rotary Automatic, for round bottles
New Jersey Pony, takes labels to 16" wide
New Jersey Pony model ML, up to quart size
New Jersey Auto. front & back, 250 bott PM
Knapp heavy duty, adjustable to #10 cans
Burt adjustable, to #10 can size
Kyler adjustable from #2 to #10 can sizes

CENTRIFUGALS

Sharples Super 6, 15,000 RPM, 3 HP motor
DeLaval Model ACVO with 15 HP motor drive
Bird Continuous 36" x 72", Iron contact
Merco type X-160, stainless contact
Tolhurst 20" vaportite, solid basket
A T & M 26" solid basket stainless steel
Fletcher 40" solid basket bottom dump

VACUUM PANS

Krenz 6' x 12' Stainless steel, coil type
Rogers 6' x 12' Stainless, 238 sq ft area
Acme 5' x 6' & 5' x 10' copper coil types
Buflovac 2 stage copper 5'6" x 12' each
Monel 7' x 7' coil type, with ejector
O'Donnell 6' x 13' copper, coil & jacket
Harris 6' dia stainless coil type
Copper 3' x 5' coil type with jacket

MISCELLANEOUS

Reitz RD-18 Disintegrator with 100 HP
FMC Rotary Blancher 12' long, var speed
Sturtevant Blower size 90 des 5
Capem 1 head automatic, now set for 20 MM
Pneumatic 4 head rotary automatic, 38 MM
FMC Gooseneck conveyor 16" buckets 25' lg
Reitz Thermoscrew, 32" x 28" x 13'6" long
Allen continuous Apple Sauce unit complete
Cameo Walking Beam Cooler 6' x 30'
Chisholm Ryder Crusher-Preheater, stainless
Proctor Schwartz Dryer, S.S. apron 8' x 80'
Devine Vac Shelf Dryer, 5 shelves 38" x 44"
FMC model 50 Pulper with 10 HP motor
Rotex #82 Sifter, 2 decks 40" x 120"
Pkg Machy model FF Wrapper for frozen food
Elliott 2 stage Ejector, 8" inlet
Pumpkin Line, from soaker to filler

PARTIAL LIST ONLY

WE BUY YOUR SURPLUS

MACHINERY AND EQUIPMENT COMPANY
514 Bryant Street • San Francisco 7, Calif.

FOOD PROCESSING EQUIPMENT FOR SALE
from our warehouse

FMC Continuous vegetable Peeler complete with 5 HP 220/440 volts Motor, reconditioned and guaranteed, capacity 4000# per hr. PRICED $1250.
FMC Continuous Steam Exhaust Box, straight thru system, suitable for all sizes of cans, including #10's. Used one short season, original cost $4500. 48" wide LaPorte Belt 24' long with 1 HP motor and Reeves Variable Drive, complete with intake and discharge conveyors. PRICED $2000.

Over 12,000 items of FOOD PROCESSING EQUIPMENT available for immediate shipment from our warehouse and present owners at terrific savings. Write, wire or phone for latest bulletin. Always contact

FOOD PROCESSING EQUIPMENT CO.
1303 Cameron St. Kalamazoo, Michigan
Phone 3-2579

FOR SALE

40 gallon stainless steel steam jacketed tilting kettle for 100 lbs. working steam pressure.
38" Copper Revolving Pans with steam coils.
300 gallon Copper Still with condenser and tank.
80 quart 3 speed Read Vertical Mixer.
#76 Enterprise Feed Grinder, belt drive.
Burns Split Nut Peanut Blancher, motor drive.

SAVAGE BROS. CO.
2636 Gladys Ave. Chicago 12, Ill.

FOR SALE
HAYSSEN WRAPPING MACHINE
Model 7-13
wired for electric eye
perfect condition
will consider trade for
automatic case sealer
THE KOSTO CO.
1115 N. Franklin St. Chicago 10, Ill.

YOUR SATISFACTION IS OUR BUSINESS

1—Bird S.S. 48" Sus. Style Cent.
1—Blaw-Knox Jack. Autoclave 110 Gal. 2000 psi.
4—Vac. Shelf Dryer 6 to 17 shelves.
5—Tray Dryers 16 to 250 sq. ft.
1—Buflovak 6' Vac. Crystallizer.
2—Sperry 18" C.I. Jack. Filter Presses.
10—Shriver 12" to 30" Filter Presses.
1—Sweetland #12 Filter 72 Brze. Leaves.
1—S.S. Condenser 368 sq. ft.
2—Vert. Closed 6000 Gal. Stainless Tanks.
8—S.S. Jack. Kettles 125 to 300 Gals. Ag.
2—Mixers 20 Gal. Jack. D.A. 15 H.P.
1—Read 100 Gal. Jack. D.A. Mixer 40 H.P.
8—Horiz. Spiral Mixers 100 to 2000#.
2—St. Regis Bag Fillers Type 100 L-S.
1—Keeler C.P. 350 H.P. Boiler.
4—Rubber Lined Steel Tanks, 42,000 Gals. each.
2—Vert. 3500 Gal. Rubber Lined Tanks.
5—Vertical Retorts 40" x 72".
1—Pfaudler 500 Gal. G.L. Reactor.
1—Pfaudler 100 Gal. G.L. Reactor.

We buy complete plants or individual items. Send us your lists and inquiries.

THE MACHINERY & EQUIPMENT CORP.
533 West Broadway, New York 12, N. Y.
GRamercy 5-6680

KOM-BI-NATOR
Marco—100 gal. per hour capacity
Suitable cakes — marshmellows — other semi solids.
Stainless steel construction. Motor driven.
HARRIS MACHINERY COMPANY
501 30th Avenue SE — Minneapolis, Minnesota

ECH ALWAYS OFFERS UNUSUAL BUYS

New Niagara SS Filter #48-H-370-4.
Buflovak & General American 42"x120" Double Drum Dryers. Complete Units.
Sparkler SS Filter, 33-D-17. Like new.
Niagara Whip Gyro #10D Sifter w/3/4HP mtr.
2200 Gal. SS Horizontal Tank, 3" Cork Insul.
Standard Knapp Labeler, adj. from gal. down.
Burkhardt 60 gal. SS Jktd. & Agtd. Kettle.
Day 15 gal. SS Pony Mixer, 2 HP Exp. Pf. Mtr.
Schutz O'Neill #3 Dustless Sugar Mill.

NEW MACHINERY DIVISION
New S/S Ribbon Mixers, all sizes.
New S/S Tanks & Jacketed Kettles.

WHAT HAVE YOU FOR SALE?
For Better Buys & Service
Phone SOuth 8-4451—9264—8782
YOU CAN BANK ON

EQUIPMENT CLEARING HOUSE, INC.
289-10th ST., BKLYN 15, N. Y.

WE HAVE IN STOCK
FOR IMMEDIATE DELIVERY
THE FOLLOWING TYPES OF EQUIPMENT

BOILERS
CANNING
CONFECTIONERY
DAIRY
FILLERS
MATERIAL HANDLING
STAINLESS STEEL JACKETED KETTLES
MEAT PACKING
MIXERS
MOTORS
PULVERIZERS
PUMPS
REFRIGERATION
SCALES
STAINLESS-STEEL TANKS
LARGE & SMALL STEEL TANKS

Consult Us for Your Food Processing Equipment
Send Us Your Inquiries
We Buy One Item or Entire Plants

AARON Equipment Company
1347 So. Ashland Ave., Chicago 8, Illinois
PHONE: CHesapeake 3-5300

IF there is anything you want . . .

that other readers of this paper can supply

or—

something you don't want

that other readers can use, advertise it in the

SEARCHLIGHT SECTION

A BRILL BUY
. . . IS THE BEST BUY

SEE THESE VALUES!

1—Sharples AH2 Nozljector 316 SS.
1—Sharples P14 Super-D-Canter 316, SS.
1—Fletcher 40" SS Suspended Centrifugal.
1—AT&M 18" steel Suspended Centrifugal.
1—2800 gallon 316 stainless steel Tank
3—Aluminum Vertical Tanks 2300 and 1400 gallon.
2—Hersey 3' x 26', 4' x 30' stainless steel Rotary Dryers.
2—Link Belt 2'7" x 8', 3'10" x 16' Roto-Louvre Dryers.
4—Devine Vacuum Dryers 4, 6 and 10—40" x 43" shelves.
3—Stokes 18" x 42", 30" x 8', 3' x 15' Rotary Vacuum Dryers.
2—Pfaudler 1000 & 500 Gallon, glass-lined, jacketed, agitated Kettles.
2—Pfaudler 100 gallon, glass-lined, jacketed Stills.
3—Buflovak 5' x 12' 48" x 108" 42" x 90" double drum Dryers.
3—Groen 150, 125 gallon, stainless steel, agitated, jacketed Kettles.
3—Mikro Pulverizers #2TH stainless steel, #1SI, #1SH.
1—Robinson 4000# Heavy Duty Mixer.
6—Rotex 40" x 120", 40" x 84", 20" x 48" single and double deck Sifters.
3—Sprout Waldron 40' x 84" single deck, stainless steel Sifters.
1—Sperry 24" Aluminum P & F Filter Press.
3—Sweetland Filters #7, #10, #12.
6—Oliver Rotary Filters 4'x5', 5'x5', 8'x8', 8'x10', 8'x12'.

Send for complete stock list

BRILL
EQUIPMENT COMPANY
2401 Third Ave., N. Y. 51, N. Y.
Tel: CYpress 2-5703 - Cable: Briston, N. Y.

IN STOCK

STAINLESS STEEL TANKS

1—8000 gal. Horiz.—UNUSED
2—6000 gal. Vert.—Used
1—5700 gal. Horiz.—UNUSED
1—3000 gal. Vert.—UNUSED
1—3000 gal. Horiz.—Used
1—2800 gal. Horiz.—Used
1—1600 gal. Vert.—UNUSED
3—1000 gal. Vert.—UNUSED
20—from 15 gal. to 500 gal. sizes

STAINLESS STEEL JACKETED KETTLES

1—150 gal. Dbl. motion agit.
1—100 gal. Dbl. motion agit.—UNUSED
4— 65 gal. Pfaudler—UNUSED
6— 50 gal. Lee, tilting, 125# pr.

ALSO—stainless steel columns, heat exchangers, condensers, filters, etc.

PERRY
EQUIPMENT CORP.
1411 N. 6th St. PHILA. 22, PA.

FMC A RELIABLE TRADING POST FOR GOOD EQUIPMENT

Stock No.	Description
3845	Food Mach. Co. Vert. Retorts; 42"x60" & 42"x72"
3259	Horiz. Retort 60"x14', steam coil & tracks
3506	Horiz. Steam Jacketed Agit. Cooker; 4'x7'
3899/L2	American Sterilizers; quick opening doors; 28"x45"; 42"x60"
3316	Bagley & Sewell Double Drum Dryer; 28"x60"
655/R6	Gen. Amer. Twin Drum Dryer; 42"x 120"
Kettles	New or Rebuilt in all sizes; Stainless, Nickel, Copper, Steel, Iron, Glass Lined; some with agitators
TANKS	STAINLESS, Vert., Horiz. all sizes; some agitated
3327/S1	Copper steam jack. Vacuum Pan; 650 gal
3113/E2	Copper coil-heated 2000 Gal. Vacuum Pan or Cooker
3870/M2	Mojonnier STAINLESS Vacuum Pan; 3'x10' with Caiandria Section S/S
McAllen	Vogt 317 H.P. Steam Generator or Boiler; complete with controls
3690/W1	Reitz S. S. DK 18 Disintegrator, 50 HP
3859	Fitzpatrick S/S. Comminutating Machine with Jkted. Cooling
3277	Robinson Double Runner Attrition Mills; 18" and 26"
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3272/L	Premier Colloid Mill; 15' rotor; with 30 H.P. motor
3876/P1	Eppenbach S. S. Homo Mixer; 1 H.P.; 7000 RPM
3262/B	Langsenkamp S/S Pulper Model B EZ Adjust; arr. for B.D.
2500/C1	Chisholm-Ryder American Utensil Model B Juice Extractor
3817	A. K. Robins Rotary Cylindor Washer; perforated drum; 24"x72"
1684/M8	U. S. Rot. Bottle & Jar Washer 60 S/S spouts
3280/W1	Horiz S/S Gravity-Vacuum Rotary 14 Spout Filler Model Hev
3484A/19	Mojonnier Rotary Vacuum Filler; 14 S. S. Stems
3350/F1	Mojonnier Rotary Vacuum-Gravity Filler; 24 Chrome Plated Stems
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2934/W1	Standard Knapp Model E Case Packer; 24 No. 2 Cans
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ADVERTISERS IN THIS ISSUE

Abbott Laboratories 14-15
Allis-Chalmers Mfg. Co. 4
Allmetal Screw Products Co., Inc. ... TR241
Alvey Conveyor Mfg. Co. 189
American Can Co. 91
American Gas Association 16
American Norit Co., Inc. TL242
American Spice Trade Assoc. BL259
American Sterilizer Co. T257
Amerio Contact Plate Freezers, Inc. ... 228
Ames Iron Works BL259
Anderson Co., V. D., The 193
Angelus Sanitary Can Machine Co. 251
Atlas Mineral Products Co. 182
Atlas Powder Co. 191

Bakelite Co., a div. of Union Carbide & Carbon Corp. 113
Baldwin-Lima-Hamilton Corp., Hamilton Division 124-125
Ball Brothers Co. 122
Beckman Instruments, Inc. 224
Bliss Co., E. W. 120
Buffalo Forge Co. 188

Cambridge Wire Cloth Co., The 218
Canning Machinery Div., Food Machinery & Chem. Corp. 8
Carpenter Steel Co., The Alloy Tube Div. 231
Century Electric Co. 18
Chain Belt Co. 183
Chase Bag Co. 116
Cherry-Burrell Corp. 204
Chevrolet Motors Div., General Motors Corp. 192
Childers Mfg. Co. 23
Chisholm-Moore Hoist Division Columbus-McKinnon Chain Corp. ... 194
Chisholm-Ryder Co., Inc. BL-257
Chrysler Corp., Dodge Trucks 249
Clark Equipment Co. 209
Cochrane Corporation 253
Colson Corp., The 129
Consolidated Packaging Machinery Corp. 132
Continental Can Co. 112
Corning Glass Works 277
Corn Products Refining Co. 203
Counsel Machine Co., Inc. 135
Crane Co. 145
Croll-Reynolds Co., Inc. 250
Crucible Steel Co. of America 17
Cyclone Fence Dept., U. S. Steel Corp. TR233

Darling Valve & Mfg. Co. 201
Day Co., The 152
Day Co., Inc., The J. H. 21
DeLaval Separator Co., The 30
Dempster Brothers, Inc. 34
Diehl Manufacturing Co. 137
Dings Electronics, Inc. 213
Distillation Products Industries, Eastman Kodak Co. 37
Diversey Corp., The 255
Dodge Mfg. Corp. 196
Dodge & Olcott, Inc. 254
Dow Corning Corp. 222
duPont de Nemours & Co., E. I. Polychemicals Dept. 119

Eastman Chemical Products, Inc. ... TL266
Economic Machinery Co. 136
Ekco Products Co. 131
Electric Auto-Lite Co., The TL234
Electro-Snap Switch & Mfg. Co. ... TR264
Ertel Engineering Corp. TR269

Ferguson Co., J. L. 134
Fielden Instrument Division, Robertshaw-Fulton Controls Co. 175
Filter Paper Co., The BL234
Firmenich Inc. 169
Florasynth Laboratories, Inc. BR248
Food Machinery & Chem. Corp. Canning Machinery Div. 8
Foxboro Co., The 236
Frick Co. BR237
Fritzsche Bros., Inc. 190
Fulton Sylphon Division, Robertshaw-Fulton Controls Co. 186

Gas Atmospheres, Inc. 127
Gaylord Container Corp. ..... Third Cover
General Amer. Trans. Corp., Tank Car ... 6
General Dynamics Corp. 165
General Electric Co., Carboloy Division 185
General Mills, Inc. 256
Geveke & Co., Inc. 123, 146
Girdler Company, The 35-36
Globe Woven Belting Co., Inc. 210
Glycerine Producers' Association 208
Goodrich Co., B. F., The 19
Gottscho, Inc., Adolph TR247
Gould-National Batteries, Inc. 239
Great Lakes Carbon Corp., Dicalite Division 170
Groen Mfg. Co. 260

Hapman Conveyors, Inc. L264
Heekin Can Co., The 86
Hinde & Dauch 173
Hoerner Corp., The 110
Hoffman-La Roche, Inc. 176
Hudson Sharp Machine Co. 126
Huron Milling Co., The BR257, BL258, BR259, BR264, BL266, BL267

Ingersoll-Rand 200
Ingredients for the Food Processor 271
International Salt Co., Inc. 139

Jamison Cold Storage Door Co. 240
Jeffrey Mfg. Co., The BR259
Jenkins Bros. 226
Johns-Manville Corp. Celite Filter & Pressing Aids 184

Keasbey & Mattison Co. 24
Klenzade Products, Inc. 172

La Porte Mat & Mfg. Co. TR237
Link-Belt Co. 23, 29
Lunkenheimer Co., The 278

Manning, Maxwell & Moore, Inc. 20
Master Electric Co., The 243
Merck & Co., Inc. 235
Minneapolis-Honeywell Reg. Co., Industrial Div. 32-33
Minnesota Mining & Mfg. Co. 100
Monarch Mfg. Works, Inc. L248
Morton Salt Co. 39
Multi-Clean Products, Inc. 197

Nash Enginering Co. 212
National Can Corp. 118
National Engineering Co. Simpson Mix-muller Div. 178
National Starch Products, Inc. 96
Neptune Meter Co. 206
Niagara Blower Co. 217
Nicholson Co., W. H. TR223
Norda, Inc. 219
Nutritional Research Associates 271

Oakite Products, Inc. 230
Oilgear Co., The 199
Oliver Corp., The A. B. Farquhar Division 227

Package Machinery Co. 128
Paisley Products Inc. 10
Palmer Thermometers, Inc. 238
Paterson Parchment Paper Co. 166
Pfaudler Co., The 111
Pfizer & Co., Inc., Chas. 31
Phillips & Co., H. A. TL258
Pitney-Bowes, Inc. 130
Pittsburgh Corning Corp. 207
Pneumatic Scale Corp., Ltd. 88
Polak & Schwarz, Inc. 263
Post Machinery Co. 117
Powell Valves 268
Powers Regulator Co., The 26-27
Precision Machine Co. BC247
Pure Oil Co., The 215

Quaker City Cold Storage Co., Inc. 271

Reeves Pulley Co. 202
Refined Syrups & Sugars, Inc. 158
Rheem Mfg. Co. 133
Richardson Scale Co. 232
Richards-Wilcox Mfg. Co. 168
Riegel Paper Corp. 171
Ritchie & Co., W. C. 115
Ryerson & Son, Inc., J. T. 40

Sarco Co., Inc. 12
Scale Specialties & Systems, Inc. 99
Scandia Mfg. Co. 150
Schutte & Koerting Co. 162
Schutz-O'Neill Co. 181
Seaplant Chemical Corp. R261
Servel, Inc. 253
Service Caster & Truck Corp. R267
Shepard Niles Crane & Hoist Corp. ... 229
Shulton, Inc. 211
Sigmamotor, Inc. BL261
Simpson Mix-muller Division, National Engineering Co. 178
Snell Inc., Foster D. BR247
Sparks & Co., A. J. T259
Spraying Systems Co. TL269
Staley Mfg. Co., A. E. 195
Standard-Knapp Div. of Emhart Mfg. Co. 108-109
Standard Oil Co. (Indiana) 187
Standard Steel Corp. 198
Stange Co., Wm. J. 245
Sterwin Chemicals Inc., Vanillin Division ..... Second Cover
Stokes & Smith Co. 114
Strahman Valves, Inc. TL261
Sturtevant Mill Co. 144

Taylor Instrument Cos. 216
Thermoid Co. 262
Timken Roller Bearing Co., The 22
Ton-Tex Corp. BR241
Transparent Wrap Machine Corp. 174
Tri-Clover Machine Co. 154

Union Bag & Paper Corp. 138
Union Carbide & Carbon Corp., Bakelite Co. 113
United States Steel Products Div., United States Steel Corp. 94
United States Steel Corp. Cyclone Fence Dept. TR233
U. S. Steel Products Div. 94
U. S. Electrical Motors, Inc. 265
U. S. Stoneware 225
U. S. Thermo Control Co. LC269

Van Ameringen-Haebler, Inc. 25
Victor Balata & Textile Belting Co. . BR223
Viking Pump Co. BL242
Vilter Mfg. Co., The 205
Visking Corp., The 121

Wallace & Tiernan Co., Inc. 214
Walworth Co. 244
Western Precipitation Corp. ... Fourth Cover
Western Waxed Paper Div., Crown Zellerbach Corp. 103
Westinghouse Electric Corp., Lamp Division 167
Westinghouse Electric Corp., Sturtevant Division 38
Where To Store Frozen Foods 271
Worthington Corporation, Air Conditioning & Refrig. Div. 220

Yarnall-Waring Co. BR233

PROFESSIONAL SERVICES 271

SEARCHLIGHT SECTION

(Classified Advertising)

H. E. Hilty, Mgr.

EMPLOYMENT
Positions Vacant 272
Selling Opportunities Offered 272
Positions Wanted 272
Employment Agencies 272

BUSINESS OPPORTUNITIES
Offered 272
Wanted 272

EQUIPMENT
(Used or Surplus New)
For Sale 273-275

WANTED
Equipment 272

ADVERTISERS INDEX

Aaron Equipment Co. 274
Allied Equipment Co. 273
Brill Equipment Co. 275
Consolidated Products Co., Inc. 275
Employment Counsel Inc. 272
Equipment Clearing House Inc. 274
First Machinery Corp. 275
Food Processing Equipment Co. 274
Gale, J. C. 272
Gelb & Sons Inc., R. 273
Harris Machinery Co. 274
Kehoe Machinery Corp., Lester 273
Kosto Co., The 274
Loeb Equipment Supply Co. 273
Machinery & Equipment Co. 274
Machinery & Equipment Corp. 274
Perry Equipment Corp. 275
Savage Bros., Co. 274
Union Standard Equipment Co. 273

SALES REPRESENTATIVES

ATLANTA 3 ..... Robert H. Sidur
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BOSTON 16 ..... P. T. Fegley
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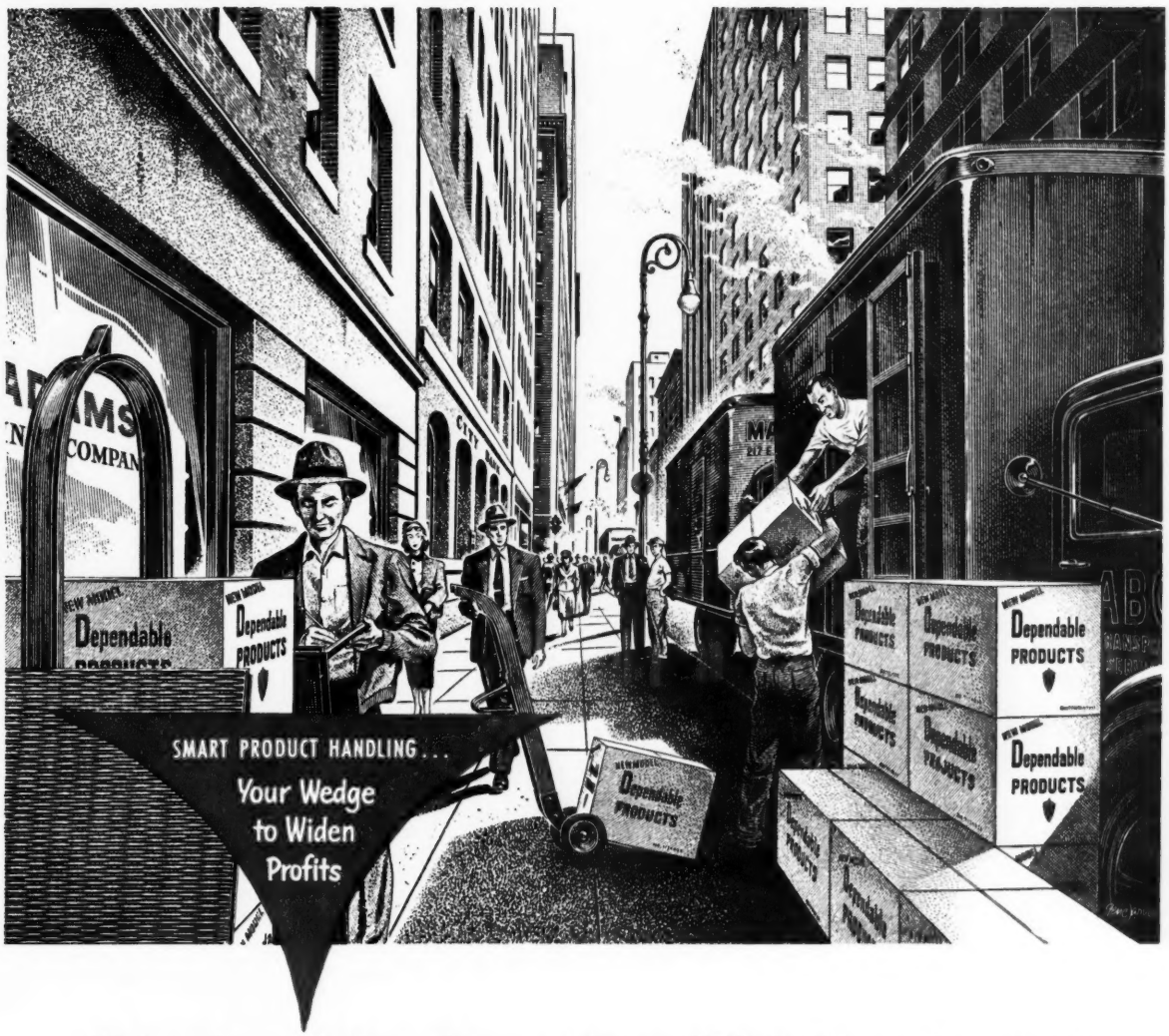

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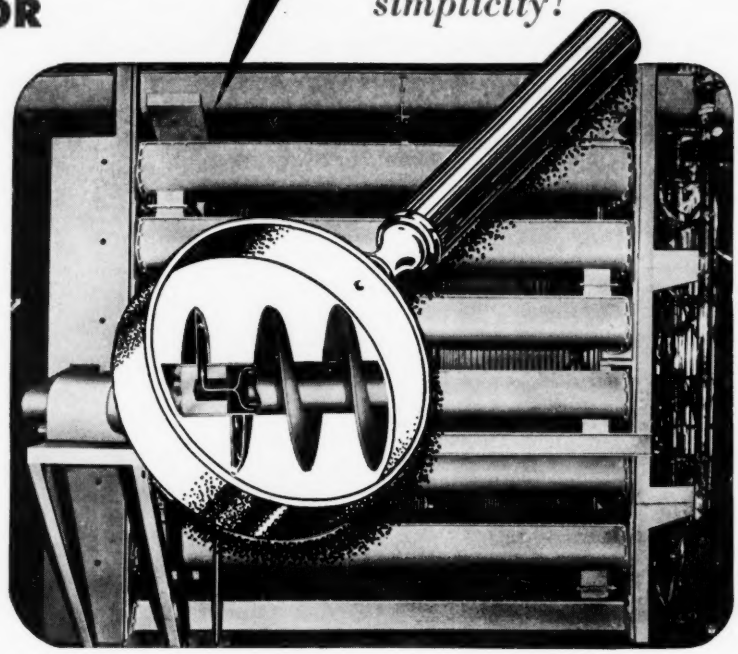

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